5-4310-452-14

ARMY TM 5-4310-452-14
MARINE CORPS TM 08917A-14

TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT,
AND GENERAL SUPPORT MAINTENANCE MANUAL

FOR

COMPRESSOR, ROTARY, AIR, DED, 250 CFM, 100 PSI TRAILER-MOUNTED
NSN 4310-01-158-3262

COMPONENT OF PNEUMATIC TOOL
AND
COMPRESSOR OUTFIT
NSN 3820-01-195-4167

INGERSOLL-RAND MODEL NUMBER P-250-WDM-H268

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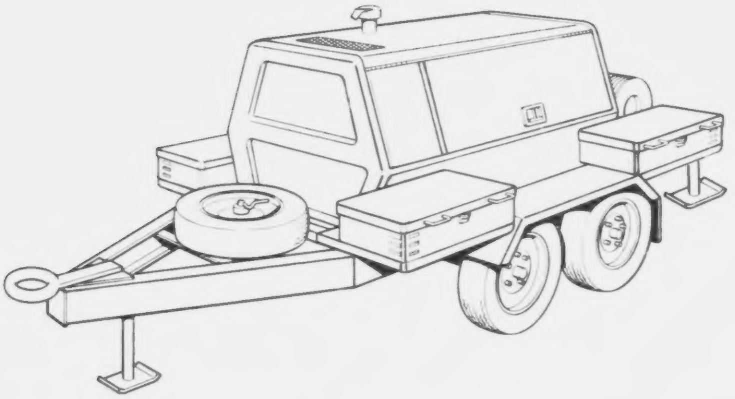

This manual and Army TM 5-4310-452-24P/Marine Corps TM 08917A-24P supersede Army TM 5-4310-452-14&P/Marine Corps TM 08917A-14&P, dated 15 July 1987.

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HEADQUARTERS, DEPARTMENT OF THE ARMY   DECEMBER 1990

READEX FICHE best copy available

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WARNING

Carbon monoxide is a colorless, odorless, deadly poisonous gas. Breathing air with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Permanent brain damage or death can result from severe exposure.

Carbon monoxide occurs in the exhaust fumes of fuel burning heaters and internal combustion engines and becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to ensure the safety of personnel whenever the engine is operated for any purpose.

(1) DO NOT operate engine in an enclosed area.

(2) DO NOT idle engine for long periods of time without adequate ventilation.

(3) Be alert at all times during operation for exhaust odors and exposure symptoms. If either is present, immediately shut down engine and ventilate area. If symptoms persist:

- Remove affected personnel from area.
- Expose to fresh air.
- Keep person warm.
- DO NOT permit physical exercise.
- Administer artificial respiration, if necessary. (For First Aid, refer to FM 21-11.)
- Notify a medic.

The M8A3 protective mask for chemical-biological-radiological (CBR) protection will not protect you from carbon monoxide poisoning.

WARNING

In the event the compressor is exposed to nuclear, biological, or chemical exposure, all air filters shall be handled with extreme caution. Unprotected personnel may experience injury or death if residual toxic agents or radioactive materials are present. If the compressor is exposed to chemical or biological agents, servicing personnel shall each wear a protective mask, hood, protective overgarments, and chemical protective gloves and boots. All decontamination procedures, as detailed in local SOP, will be performed.

WARNING

- Battery acid (electrolyte) is extremely dangerous. Always wear goggles and rubber gloves when performing battery checks or inspections. Serious injury to personnel will result if battery acid contacts skin or eyes.
- DO NOT perform battery system checks or inspections while smoking or near fire, flames, or sparks. Batteries may explode, causing serious injury or death to personnel.
- Remove all jewelry such as dog tags, rings, bracelets, etc. If jewelry or disconnected battery ground cable contacts battery terminal, a direct short will result. Failure to follow proper disconnection procedures will result in serious injury or death to personnel, or equipment damage.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F–130°F (38°C–59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

WARNING

- Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.
- Compressed air is dangerous. Check all connections. A loose hose connection may disengage completely, whip around, and injure personnel in the work area.
- Wear safety shoes and eye and ear protectors, nose mask, hard hat, and gloves when operating air tools.

WARNING

DO NOT tow the compressor with an unauthorized vehicle. The drawbar/lunette mounting bolts may shear, allowing the compressor to disengage from the towing vehicle, endangering personnel and causing damage to the equipment.

WARNING

When operating the jackhammer drill, keep feet clear of drill steel to prevent injury if drill breaks. DO NOT operate the jackhammer drill without a drill steel shank in the fronthead. Hold the drill firmly against the work. Never rest the jackhammer drill on the feet.

WARNING

Open the manual blowdown valve slowly, being careful to keep face and any bare skin away from the valve opening.

WARNING

DO NOT interchange the following new 25 lb. Paving Breaker and Tool Components with the older 25 lb. Paving Breaker and Tool Components. Serious injury could result as components of these two Paving Breakers are not interchangeable and do not securely lock in place.

- New 25 lb. Paving Breaker, NSN 3820-01-195-4167, 7/8 in. hexagon by 3 1/4 in. shank, chuck, with the following component tools:

NSN	ITEM
3820-01-194-6800	Chisel, Paving Breaker, 3 1/4 in. shank
3820-01-194-6801	Pick, Paving Breaker, 3 1/4 in. shank
3820-01-194-6802	Spade, Paving Breaker, 3 1/4 in. shank
3820-01-248-7863	Moil Point, Paving Breaker, 3 1/4 in. shank

- Older 25 lb. Paving Breaker, NSN 3820-00-292-0076, 7/8 in. by 2 3/4 in. shank, chuck, with the following component tools:

NSN	ITEM
3820-00-290-4271	Chisel, Paving Breaker, 2 3/4 in. shank
3820-00-290-4269	Pick, Paving Breaker, 2 3/4 in. shank
3820-00-290-4282	Spade, Paving Breaker, 2 3/4 in. shank
3820-00-290-4277	Moil Point, Paving Breaker, 2 3/4 in. shank

*TM 5-4310-452-14
TM 08917A-14

TECHNICAL MANUAL

TM 5-4310-452-14
TM 08917A-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., *27 December 1990*

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL

FOR

COMPRESSOR, ROTARY, AIR, DED, 250 CFM, 100 PSI TRAILER-MOUNTED

NSN 4310-01-158-3262

COMPONENT OF PNEUMATIC TOOL AND COMPRESSOR OUTFIT

NSN 3820-01-195-4167

INGERSOLL-RAND MODEL NUMBER P-250-W-D-M-H268

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (*Recommended Changes to Publications and Blank Forms*), or DA Form 2028-2, located in the back of this manual, direct to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48397-5000. (Marine Corps) Submit NAVMC 10772 to the Commanding General, Marine Corps Logistics Base (Code 850), Albany, GA 31704. A reply will be furnished to you.

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*** This manual and Army TM 5-4310-452-24P/Marine Corps TM 08917A-24P supersede Army TM 5-4310-452-14&P/ TM 08917A-14&P, dated July 1987.**

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HOW TO USE THIS MANUAL

This manual is designed to help maintain the 250 CFM Trailer-Mounted Compressor Unit. This manual describes in detail the Operator's, Organizational, Direct Support, and General Support Maintenance prescribed by the Maintenance Allocation Chart (Appendix B) and Source, Maintenance, and Recoverability (SMR) Codes (TM 5-4310-452-24P).

FEATURES OF THIS MANUAL:

- Bleed-to-edge indicators on the cover and on the edge of the applicable manual pages provide quick access to chapters and sections most often used.
- A table of contents is provided for all chapters, sections, and appendices.
- WARNINGs, CAUTIONs, NOTEs, subject headings, and other important information is highlighted in **bold** print as a visual aid.
- Statements and words of particular importance are printed in capital letters to create emphasis.
- Instructions are located together with figures that illustrate the specific task on which the maintainer is working. In many cases, the task steps and illustrations are located side-by-side, making identification and procedure sequence easier to follow.
- An alphabetical index is provided at the end of the manual to assist in locating information not readily found in the table of contents.
- Technical instructions include metric in addition to standard units. A metric conversion chart is provided on the inside back cover.

FOLLOW THESE GUIDELINES WHEN YOU USE THE MANUAL:

- Read through this manual and become familiar with its contents before proceeding to specific maintenance tasks.
- A warning summary is provided at the beginning of this manual and should be read before performing any maintenance tasks.
- In the actual maintenance tasks, follow all WARNINGs, CAUTIONs, and NOTEs. These are given immediately preceding the procedural steps to which they apply. If these instructions are not followed or care is not taken, injury to personnel or equipment damage may result.
- With a chapter, section, or paragraph, headings are used to help group the material and assist in quickly finding tasks. Read all preliminary information found at the beginning of each task. After completing a task, ALWAYS perform the follow-on maintenance at the end of the task.

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

Paragraph Number	Title	Page Number
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1-1. SCOPE.

This manual describes the operation, troubleshooting, and maintenance of the 250 CFM Trailer-Mounted Compressor Unit for crew, organizational, direct support, and general support mechanics.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS.

Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by DA Pam 738-750, *The Army Maintenance Management System (TAMMS)*.

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

For destruction of Army materiel to prevent enemy use, refer to TM 750-244-6, *Procedures for the Destruction of Tank-Automotive Equipment to Prevent Enemy Use.*

1-4. PREPARATION FOR STORAGE OR SHIPMENT.

For information on preparing the 250 CFM Trailer-Mounted Compressor Unit for storage or shipment, refer to Chapter 4, Section XVI.

1-5. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).

If your compressor unit needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 *(Quality Deficiency Report)*. Mail it to us at: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MP, Warren, MI 48397-5000. We'll send you a reply.

1-6. WARRANTY INFORMATION.

The compressor unit is warrantied by Ingersoll-Rand for 15 months or 1500 hours, whichever comes first. Warranty begins on the date shown in Block 23 of DA Form 2408-9 *(Equipment Control Record)*. Report all defects in materiel or workmanship to your supervisor, who will take appropriate action through your unit maintenance shop.

1-7. TOOLS AND REPAIR PARTS.

a. For authorized common tools and test equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your compressor unit. Repair parts; special tools; test, measurement, and diagnostic equipment (TMDE); and support equipment required to maintain the 250 CFM Trailer-Mounted Compressor Unit are found in TM 5-4310-452-24P.

b. For authorized components of pneumatic tool and compressor outfit, refer to SC 3820-98-CL-E09.

Section II. EQUIPMENT DESCRIPTION

Paragraph Number	Title	Page Number
1-8	Equipment Characteristics, Capabilities, and Features	1-3
1-9	Location and Description of Major Components	1-4
1-10	Location and Contents of Stencil Markings, Decals, and Plates	1-6
1-11	Equipment Data	1-10

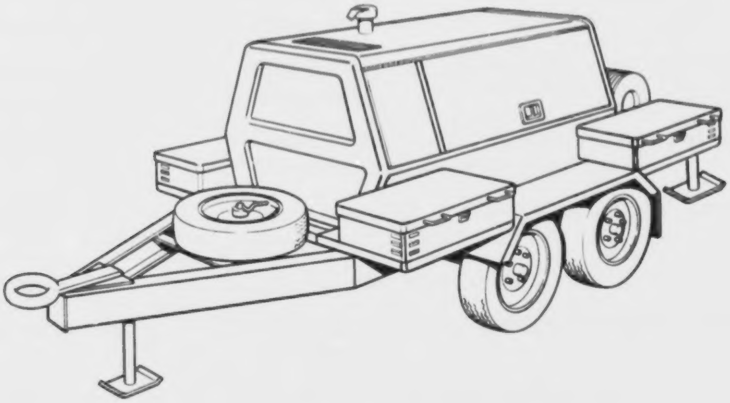
1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. The 250 CFM Trailer-Mounted Compressor Unit is designed to provide a power source for portable, pneumatic hand tools and includes the following features:

- Portable
- Engine: Heavy-duty diesel, industrial-type
- Compressor: Heavy-duty industrial-type, matched to engine
- Full, but simplified instrumentation
- Completely enclosed in silencing-type housing
- Full load sound rating of 76 decibels at 23 feet (7 meters)
- Uses JP5, JP8, and diesel fuels
- Delivers 250 cfm (118 cu dm/sec) compressed air

b. The trailer which supports the air compressor and diesel engine includes the following features:

- Frame: Four-wheel, heavy-duty, industrial-type
- Four tool boxes mounted to the frame for tool storage
- Drill rod box mounted to the frame for drill rod storage
- Stabilizing and leveling jacks to level the unit at the work site
- Air/hydraulic service brake system actuated by the towing vehicle
- Parking brake to aid in stabilizing unit during operation
- Shock absorbers for a smoother ride



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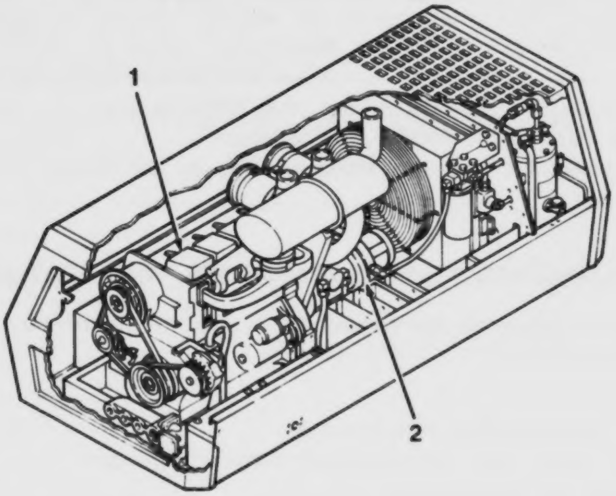
1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.



Key	Component	Description
1	Engine	Provides power to drive the compressor.
2	Compressor	Engine-driven to compress air to 250 cfm (118 cu dm/sec).

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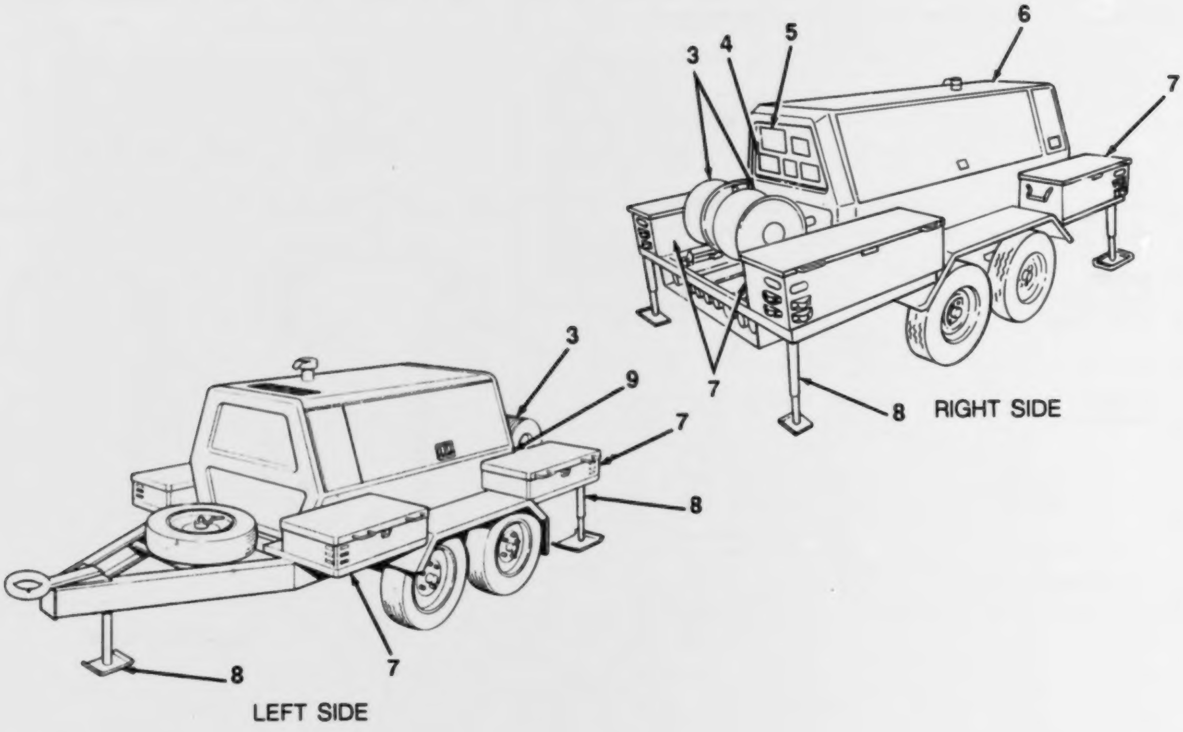
1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Con't).



Key	Component	Description
3	Air Hose Reels	Store air hoses when not in use.
4	Control Panel	Provides the necessary controls to safely operate the engine and compressor.
5	Indicator Panel	Provides the necessary indicators to safely monitor the operation of the engine and compressor.
6	Housing	Reduces noise and protects engine, compressor, and associated components.
7	Tool Boxes	Unit has four tool boxes for tool storage.
8	Leveling Jacks	Unit has three jacks to stabilize and level the compressor unit on work site.
9	Drill Rod Box	Stores drill rods when not in use.

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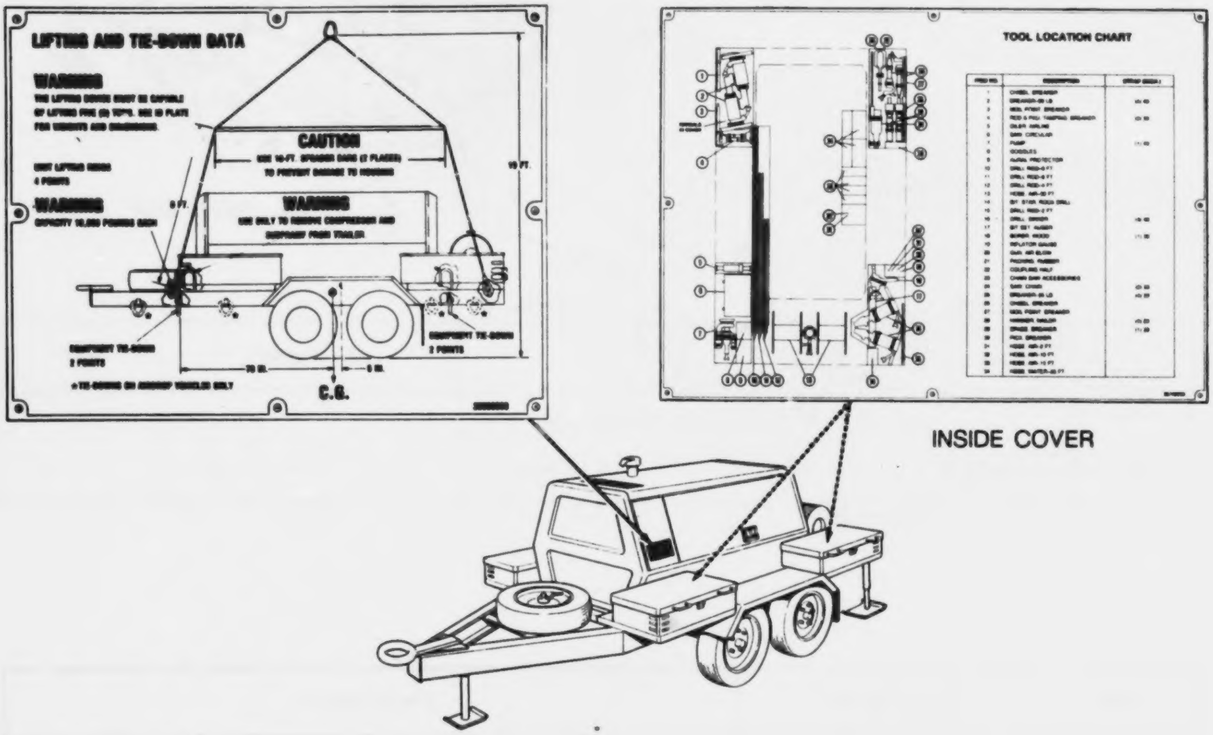
1-10. LOCATION AND CONTENTS OF STENCIL MARKINGS, DECALS, AND PLATES.

a. The following illustrations show the location and contents of each compressor unit stencil marking, decal, and plate.

b. Maintain all stencil markings, decals, and plates so that all information remains legible. If any are missing or no longer legible, replace or repaint.



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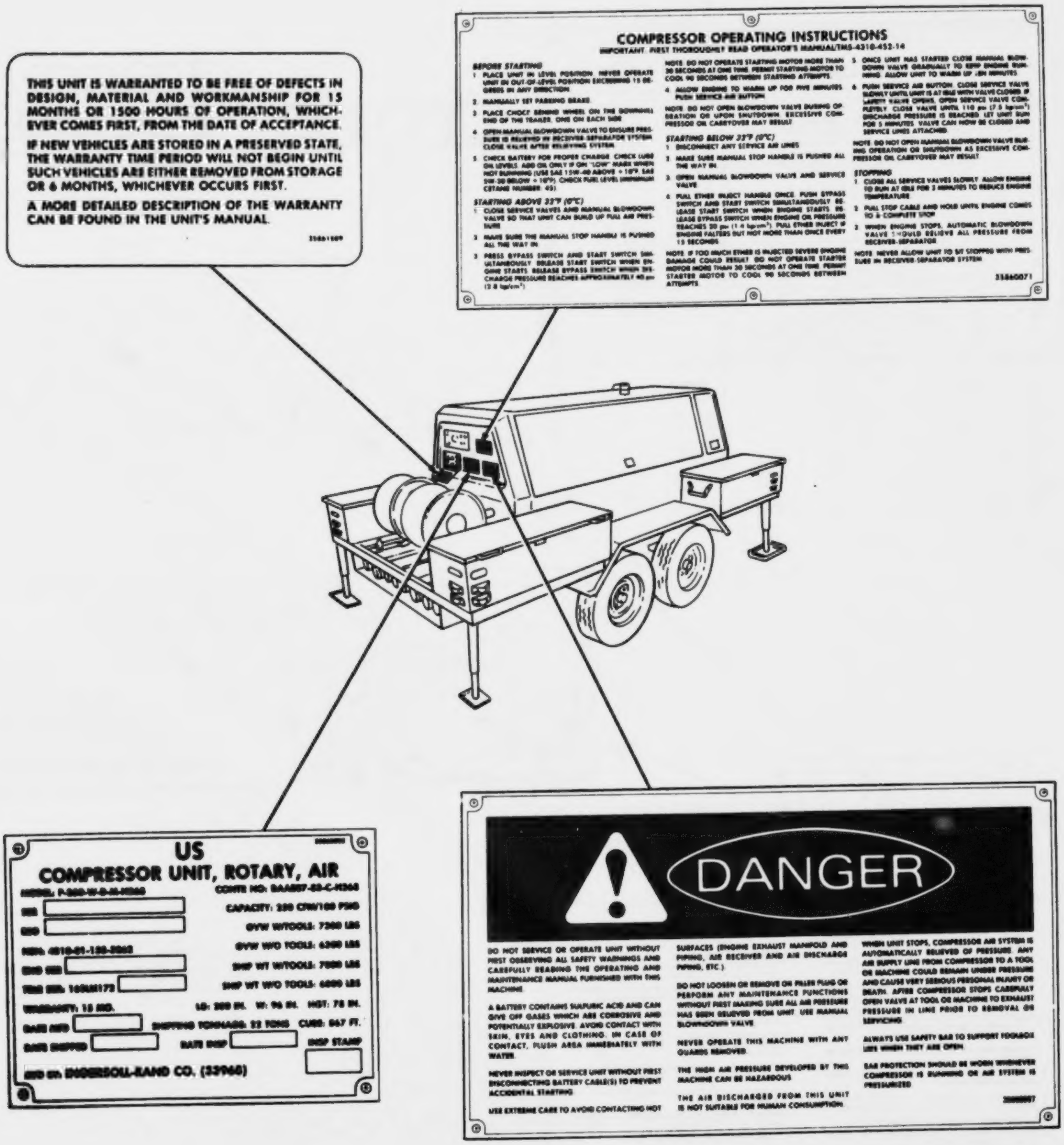
1-10. LOCATION AND CONTENTS OF STENCIL MARKINGS, DECALS, AND PLATES (Con't).



THIS UNIT IS WARRANTED TO BE FREE OF DEFECTS IN DESIGN, MATERIAL AND WORKMANSHIP FOR 15 MONTHS OR 1500 HOURS OF OPERATION, WHICHEVER COMES FIRST, FROM THE DATE OF ACCEPTANCE.

IF NEW VEHICLES ARE STORED IN A PRESERVED STATE, THE WARRANTY TIME PERIOD WILL NOT BEGIN UNTIL SUCH VEHICLES ARE EITHER REMOVED FROM STORAGE OR 6 MONTHS, WHICHEVER OCCURS FIRST.

A MORE DETAILED DESCRIPTION OF THE WARRANTY CAN BE FOUND IN THE UNIT'S MANUAL.

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COMPRESSOR OPERATING INSTRUCTIONS

IMPORTANT: FIRST THOROUGHLY READ OPERATOR'S MANUAL/TM5-4310-452-14

BEFORE STARTING

1. PLACE UNIT IN LEVEL POSITION. NEVER OPERATE UNIT IN OUT-OF-LEVEL POSITION EXCEEDING 15 DEGREES IN ANY DIRECTION.
2. MANUALLY SET PARKING BRAKE.
3. PLACE CHOCK BEHIND WHEEL ON THE DOWNHILL END OF THE TRAILER, ONE ON EACH SIDE.
4. OPEN MANUAL BLOWDOWN VALVE TO ENSURE PRESSURE IS RELIEVED IN RECEIVER-SEPARATOR SYSTEM. CLOSE VALVE AFTER RELIEVING SYSTEM.
5. CHECK BATTERY FOR PROPER CHARGE. CHECK LUBE OIL LEVELS. ADD OIL ONLY IF ON "LOW" MARK WHEN NOT RUNNING (USE SAE 15W-40 ABOVE +10°F, SAE 5W-30 BELOW +10°F). CHECK FUEL LEVEL (MINIMUM CETANE NUMBER: 45)

STARTING ABOVE 32°F (0°C)

1. CLOSE SERVICE VALVES AND MANUAL BLOWDOWN VALVE SO THAT UNIT CAN BUILD UP FULL AIR PRESSURE.
2. MAKE SURE THE MANUAL STOP HANDLE IS PUSHED ALL THE WAY IN.
3. PRESS BYPASS SWITCH AND START SWITCH SIMULTANEOUSLY. RELEASE START SWITCH WHEN ENGINE STARTS. RELEASE BYPASS SWITCH WHEN DISCHARGE PRESSURE REACHES APPROXIMATELY 40 psi (2.8 kg/cm²).

NOTE: DO NOT OPERATE STARTING MOTOR MORE THAN 30 SECONDS AT ONE TIME. PERMIT STARTING MOTOR TO COOL 90 SECONDS BETWEEN STARTING ATTEMPTS.

4. ALLOW ENGINE TO WARM UP FOR FIVE MINUTES. PUSH SERVICE AIR BUTTON.

NOTE: DO NOT OPEN BLOWDOWN VALVE DURING OPERATION OR UPON SHUTDOWN. EXCESSIVE COMPRESSOR OIL CARRYOVER MAY RESULT.

STARTING BELOW 32°F (0°C)

1. DISCONNECT ANY SERVICE AIR LINES.
2. MAKE SURE MANUAL STOP HANDLE IS PUSHED ALL THE WAY IN.
3. OPEN MANUAL BLOWDOWN VALVE AND SERVICE VALVE.
4. PULL ETHER INJECT HANDLE ONCE. PUSH BYPASS SWITCH AND START SWITCH SIMULTANEOUSLY. RELEASE START SWITCH WHEN ENGINE STARTS. RELEASE BYPASS SWITCH WHEN ENGINE OIL PRESSURE REACHES 20 psi (1.4 kg/cm²). PULL ETHER INJECT IF ENGINE FALTERS BUT NOT MORE THAN ONCE EVERY 15 SECONDS.

NOTE: IF TOO MUCH ETHER IS INJECTED SEVERE ENGINE DAMAGE COULD RESULT. DO NOT OPERATE STARTER MOTOR MORE THAN 30 SECONDS AT ONE TIME. PERMIT STARTER MOTOR TO COOL 90 SECONDS BETWEEN ATTEMPTS.

5. ONCE UNIT HAS STARTED CLOSE MANUAL BLOWDOWN VALVE GRADUALLY TO KEEP ENGINE RUNNING. ALLOW UNIT TO WARM UP TEN MINUTES.
6. PUSH SERVICE AIR BUTTON. CLOSE SERVICE VALVE SLOWLY UNTIL UNIT IS AT IDLE WITH VALVE CLOSED. IF SAFETY VALVE OPENS, OPEN SERVICE VALVE COMPLETELY. CLOSE VALVE UNTIL 110 psi (7.5 kg/cm²) DISCHARGE PRESSURE IS REACHED. LET UNIT RUN FOR 5 MINUTES. VALVE CAN NOW BE CLOSED AND SERVICE LINES ATTACHED.

NOTE: DO NOT OPEN MANUAL BLOWDOWN VALVE DURING OPERATION OR SHUTDOWN AS EXCESSIVE COMPRESSOR OIL CARRYOVER MAY RESULT.

STOPPING

1. CLOSE ALL SERVICE VALVES SLOWLY. ALLOW ENGINE TO RUN AT IDLE FOR 3 MINUTES TO REDUCE ENGINE TEMPERATURE.
2. PULL STOP CABLE AND HOLD UNTIL ENGINE COMES TO A COMPLETE STOP.
3. WHEN ENGINE STOPS, AUTOMATIC BLOWDOWN VALVE SHOULD RELIEVE ALL PRESSURE FROM RECEIVER-SEPARATOR.

NOTE: NEVER ALLOW UNIT TO SIT STOPPED WITH PRESSURE IN RECEIVER-SEPARATOR SYSTEM.

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US

COMPRESSOR UNIT, ROTARY, AIR

MODEL: P-250-W-D-M-H260
CONTR NO: DAAE07-83-C-H260
SER ☐
CAPACITY: 250 CFM/100 PSIG
MFD ☐
GVW W/TOOLS: 7200 LBS
GVW W/O TOOLS: 6200 LBS
NSN: 4310-01-158-2002
SHIP WT W/TOOLS: 7000 LBS
END SER ☐
SHIP WT W/O TOOLS: 6000 LBS
TRLR SER: 16SM172 ☐
WARRANTY: 15 MO.
LG: 200 IN. W: 96 IN. HGT: 78 IN.
DATE MFD ☐
SHIPPING TONNAGE: 22 TONS CUBE: 867 FT.
DATE SHIPPED ☐
DATE INSP ☐
INSP STAMP ☐
MFD BY: INGERSOLL-RAND CO. (32960)

DANGER

DO NOT SERVICE OR OPERATE UNIT WITHOUT FIRST OBSERVING ALL SAFETY WARNINGS AND CAREFULLY READING THE OPERATING AND MAINTENANCE MANUAL FURNISHED WITH THIS MACHINE.

A BATTERY CONTAINS SULFURIC ACID AND CAN GIVE OFF GASES WHICH ARE CORROSIVE AND POTENTIALLY EXPLOSIVE. AVOID CONTACT WITH SKIN, EYES AND CLOTHING. IN CASE OF CONTACT, FLUSH AREA IMMEDIATELY WITH WATER.

NEVER INSPECT OR SERVICE UNIT WITHOUT FIRST DISCONNECTING BATTERY CABLE(S) TO PREVENT ACCIDENTAL STARTING.

USE EXTREME CARE TO AVOID CONTACTING HOT SURFACES (ENGINE EXHAUST MANIFOLD AND PIPING, AIR RECEIVER AND AIR DISCHARGE PIPING, ETC.).

DO NOT LOOSEN OR REMOVE OIL FILLER PLUG OR PERFORM ANY MAINTENANCE FUNCTIONS WITHOUT FIRST MAKING SURE ALL AIR PRESSURE HAS BEEN RELIEVED FROM UNIT. USE MANUAL BLOWDOWN VALVE.

NEVER OPERATE THIS MACHINE WITH ANY GUARDS REMOVED.

THE HIGH AIR PRESSURE DEVELOPED BY THIS MACHINE CAN BE HAZARDOUS.

THE AIR DISCHARGED FROM THIS UNIT IS NOT SUITABLE FOR HUMAN CONSUMPTION.

WHEN UNIT STOPS, COMPRESSOR AIR SYSTEM IS AUTOMATICALLY RELIEVED OF PRESSURE. ANY AIR SUPPLY LINE FROM COMPRESSOR TO A TOOL OR MACHINE COULD REMAIN UNDER PRESSURE AND CAUSE VERY SERIOUS PERSONAL INJURY OR DEATH. AFTER COMPRESSOR STOPS CAREFULLY OPEN VALVE AT TOOL OR MACHINE TO EXHAUST PRESSURE IN LINE PRIOR TO REMOVAL OR SERVICING.

ALWAYS USE SAFETY BAR TO SUPPORT TOOLBOX LIDS WHEN THEY ARE OPEN.

EAR PROTECTION SHOULD BE WORN WHENEVER COMPRESSOR IS RUNNING OR AIR SYSTEM IS PRESSURIZED.

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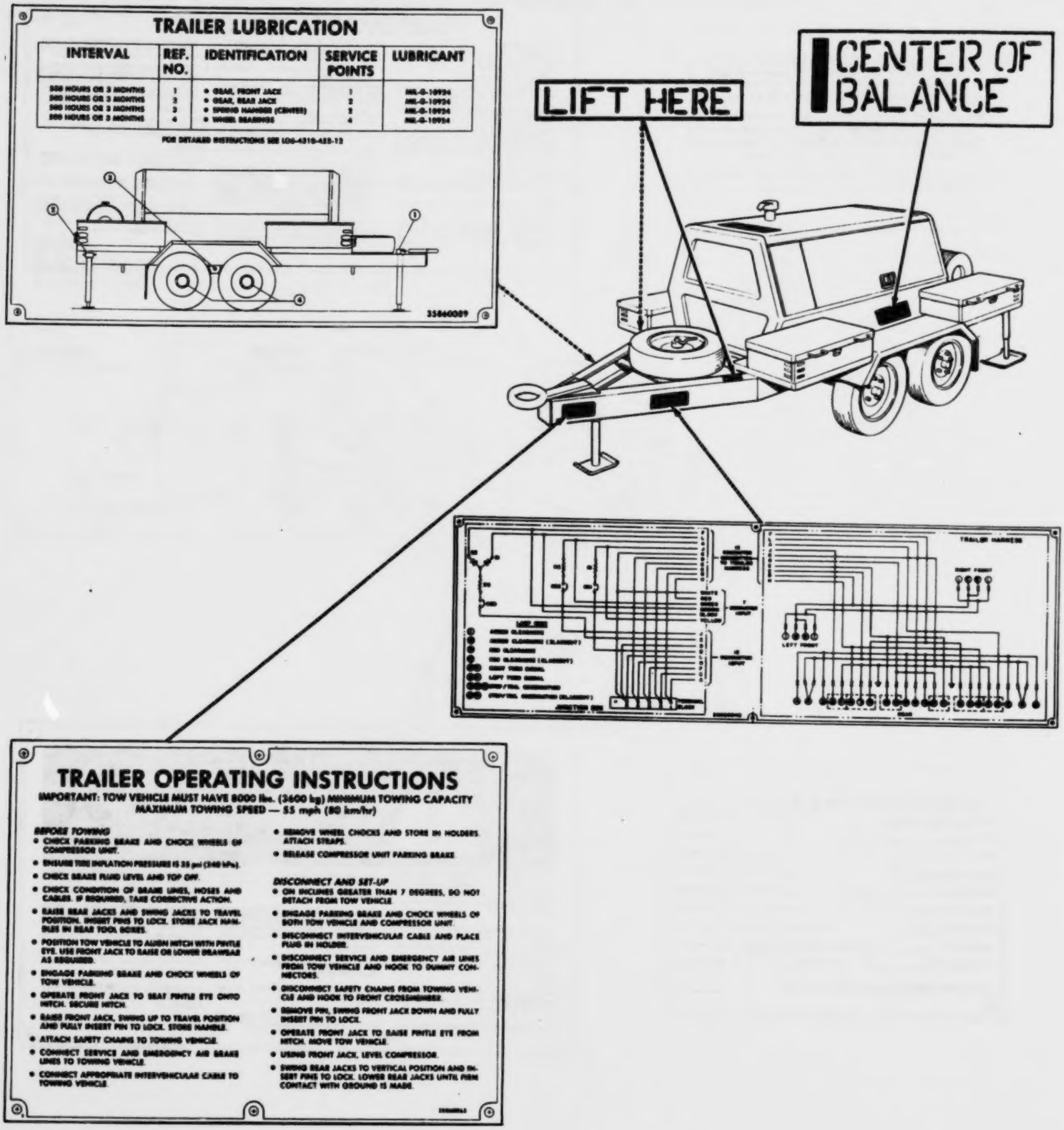
1-10. LOCATION AND CONTENTS OF STENCIL MARKINGS, DECALS, AND PLATES (Con't).



TRAILER LUBRICATION

INTERVAL	REF. NO.	IDENTIFICATION	SERVICE POINTS	LUBRICANT
500 HOURS OR 3 MONTHS	1	• GEAR, FRONT JACK	1	MIL-G-10924
500 HOURS OR 3 MONTHS	2	• GEAR, REAR JACK	2	MIL-G-10924
500 HOURS OR 3 MONTHS	3	• SPRING HANGER (CENTER)	2	MIL-G-10924
500 HOURS OR 3 MONTHS	4	• WHEEL BEARINGS	4	MIL-G-10924

FOR DETAILED INSTRUCTIONS SEE LO5-4310-452-12

TRAILER OPERATING INSTRUCTIONS

IMPORTANT: TOW VEHICLE MUST HAVE 8000 lbs. (3600 kg) MINIMUM TOWING CAPACITY
MAXIMUM TOWING SPEED — 55 mph (80 km/hr)

BEFORE TOWING

- CHECK PARKING BRAKE AND CHOCK WHEELS OF COMPRESSOR UNIT.
- ENSURE TIRE INFLATION PRESSURE IS 35 psi (240 kPa).
- CHECK BRAKE FLUID LEVEL AND TOP OFF.
- CHECK CONDITION OF BRAKE LINES, HOSES AND CABLES. IF REQUIRED, TAKE CORRECTIVE ACTION.
- RAISE REAR JACKS AND SWING JACKS TO TRAVEL POSITION. INSERT PINS TO LOCK. STORE JACK HANDLES IN REAR TOOL BOXES.
- POSITION TOW VEHICLE TO ALIGN HITCH WITH PINTLE EYE. USE FRONT JACK TO RAISE OR LOWER DRAWBAR AS REQUIRED.
- ENGAGE PARKING BRAKE AND CHOCK WHEELS OF TOW VEHICLE.
- OPERATE FRONT JACK TO SEAT PINTLE EYE ONTO HITCH. SECURE HITCH.
- RAISE FRONT JACK, SWING UP TO TRAVEL POSITION AND FULLY INSERT PIN TO LOCK. STORE HANDLE.
- ATTACH SAFETY CHAINS TO TOWING VEHICLE.
- CONNECT SERVICE AND EMERGENCY AIR BRAKE LINES TO TOWING VEHICLE.
- CONNECT APPROPRIATE INTERVEHICULAR CABLE TO TOWING VEHICLE.
- REMOVE WHEEL CHOCKS AND STORE IN HOLDERS. ATTACH STRAPS.
- RELEASE COMPRESSOR UNIT PARKING BRAKE.

DISCONNECT AND SET-UP

- ON INCLINES GREATER THAN 7 DEGREES, DO NOT DETACH FROM TOW VEHICLE.
- ENGAGE PARKING BRAKE AND CHOCK WHEELS OF BOTH TOW VEHICLE AND COMPRESSOR UNIT.
- DISCONNECT INTERVEHICULAR CABLE AND PLACE PLUG IN HOLDER.
- DISCONNECT SERVICE AND EMERGENCY AIR LINES FROM TOW VEHICLE AND HOOK TO DUMMY CONNECTORS.
- DISCONNECT SAFETY CHAINS FROM TOWING VEHICLE AND HOOK TO FRONT CROSSMEMBER.
- REMOVE PIN, SWING FRONT JACK DOWN AND FULLY INSERT PIN TO LOCK.
- OPERATE FRONT JACK TO RAISE PINTLE EYE FROM HITCH. MOVE TOW VEHICLE.
- USING FRONT JACK, LEVEL COMPRESSOR.
- SWING REAR JACKS TO VERTICAL POSITION AND INSERT PINS TO LOCK. LOWER REAR JACKS UNTIL FIRM CONTACT WITH GROUND IS MADE.

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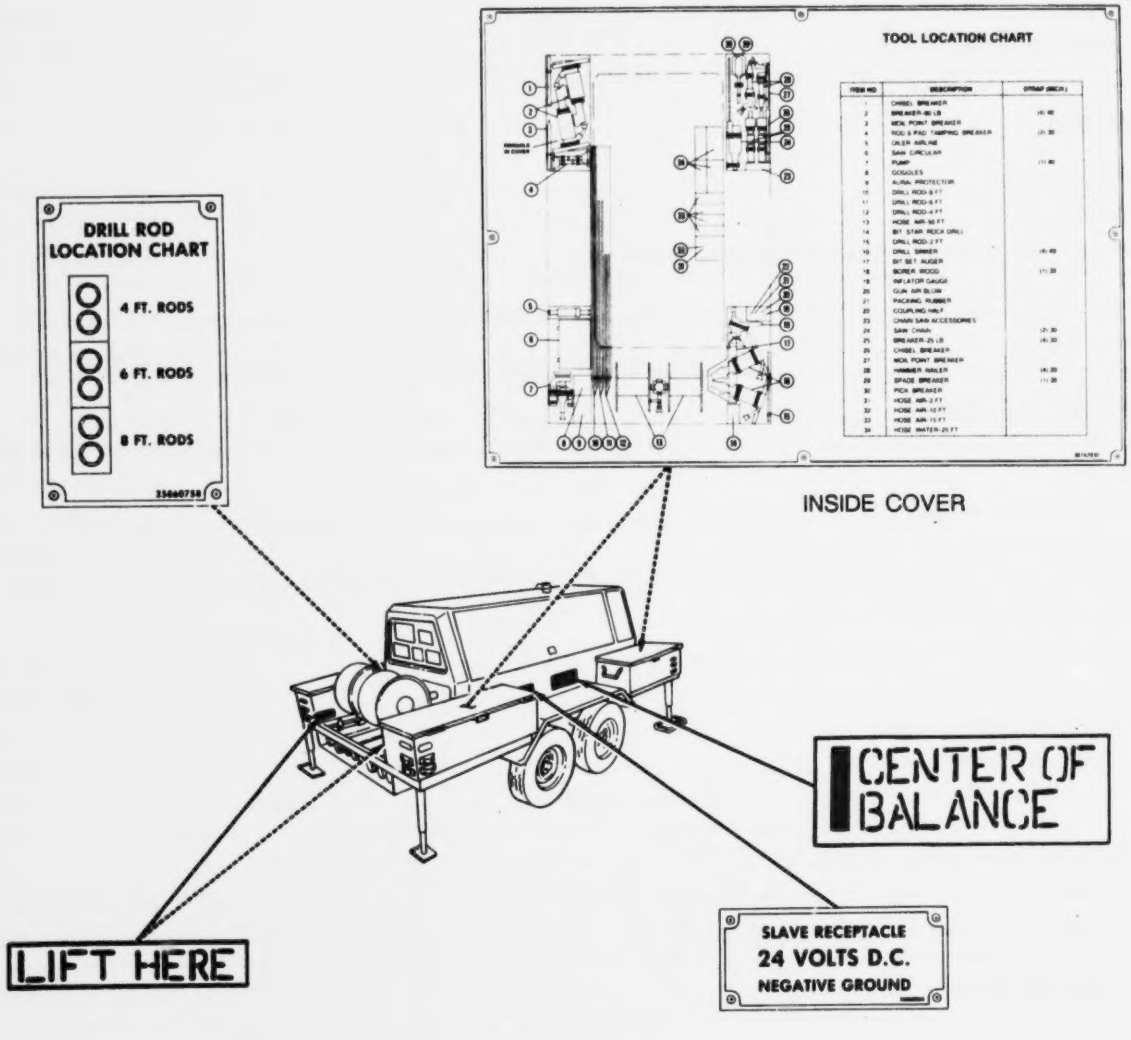
1-10. LOCATION AND CONTENTS OF STENCIL MARKINGS, DECALS, AND PLATES (Con't).



TOOL LOCATION CHART

ITEM NO	DESCRIPTION	STRAP (INCH)
1	CHISEL BREAKER	
2	BREAKER-80 LB	(4) 40
3	MOIL POINT BREAKER	
4	ROD & PAD TAMPING BREAKER	(2) 30
5	OILER AIRLINE	
6	SAW CIRCULAR	
7	PUMP	(1) 40
8	GOGGLES	
9	AURAL PROTECTOR	
10	DRILL ROD-8 FT	
11	DRILL ROD-6 FT	
12	DRILL ROD-4 FT	
13	HOSE AIR-50 FT	
14	BIT STAR ROCK DRILL	
15	DRILL ROD-2 FT	
16	DRILL SINKER	(4) 40
17	BIT SET AUGER	
18	BORER WOOD	(1) 30
19	INFLATOR GAUGE	
20	GUN AIR BLOW	
21	PACKING RUBBER	
22	COUPLING HALF	
23	CHAIN SAW ACCESSORIES	
24	SAW CHAIN	(2) 30
25	BREAKER-25 LB	(4) 30
26	CHISEL BREAKER	
27	MOIL POINT BREAKER	
28	HAMMER NAILER	(4) 30
29	SPADE BREAKER	(1) 30
30	PICK BREAKER	
31	HOSE AIR-2 FT	
32	HOSE AIR-10 FT	
33	HOSE AIR-15 FT	
34	HOSE WATER-25 FT	

1-11. EQUIPMENT DATA.

COMPRESSOR	
Manufacturer	Ingersoll-Rand Company
Model	P-250-W-D-M-H268
Output	250 cfm (118 cu dm/sec)
Rated Operating Pressure	100 psi (690 kPa)
ENGINE	
Manufacturer	Deutz Corporation
Model	F4L912
Weight, Approximate (less starter and alternator)	660 lb (300 kg)
Fuel Tank Capacity	34 gl (128.7 l)
Fuel Types	JP5, JP8, and Diesel
Number of Cylinders	4
Bore	3.94 in. (10 cm)
Stroke	4.72 in. (12 cm)
Piston Displacement	231 cu in. (3850 cc)
Direction of Rotation (facing flywheel)	Counterclockwise
Type	Four-stroke Diesel, Direct Injection
Firing Order (cylinder 1 at flywheel end)	1-3-4-2
Valve Timing (crank angle)	32° bTDC
Inlet Valve, Close	60° aBDC
Exhaust Valves, Open	70° bBDC
Exhaust Valves, Closed	32° aTDC
Piston Crown Clearance (measured with lead wire)	0.039–0.047 in. (0.99–1.2 mm)
Injection Release Pressure:	
Used Injector (check for keeping injector in use)	2573 psi (17741 kPa)
New or Overhauled Injector (original setting)	2646 psi (18244 kPa)
Lubrication System	Forced Lubrication
Oil Capacity:	
Initial Fill	Approx. 2.9 gl (11 l)
Refill	Approx. 2.5 gl (9.5 l)
Start of Injection (crank angle)	With Rigid Drive, up to 2800/min 32° +1° bTDC
Valve Clearance (engine cold)	0.0059 in. (0.15 mm)

Section III. TECHNICAL PRINCIPLES OF OPERATION

Paragraph Number	Title	Page Number
1-12	General	1-11
1-13	Engine	1-12
1-14	Fuel System	1-13
1-15	Air Compressor	1-14
1-16	Lubrication System	1-16

1-12. GENERAL.

NOTE

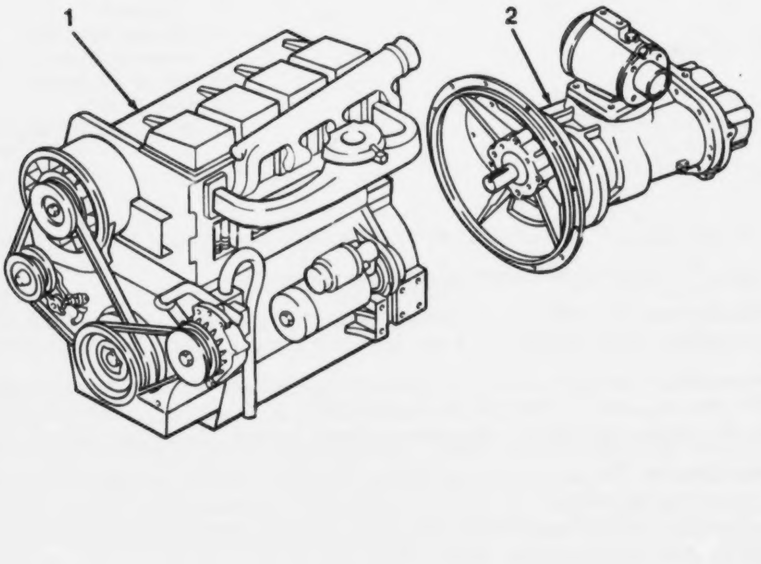
The operator should become familiar with all illustrations in this section.

a. The compressor is driven by an air-cooled diesel engine.

b. The engine (1) and compressor (2) are constructed as an integral unit; the compressor is direct-driven from the engine. The engine and compressor are enclosed in a housing and carried on a common trailer.

c. The unit must be level and plumb to the ground within 15° when at work site.

d. The following illustration shows the location of the system's major components.



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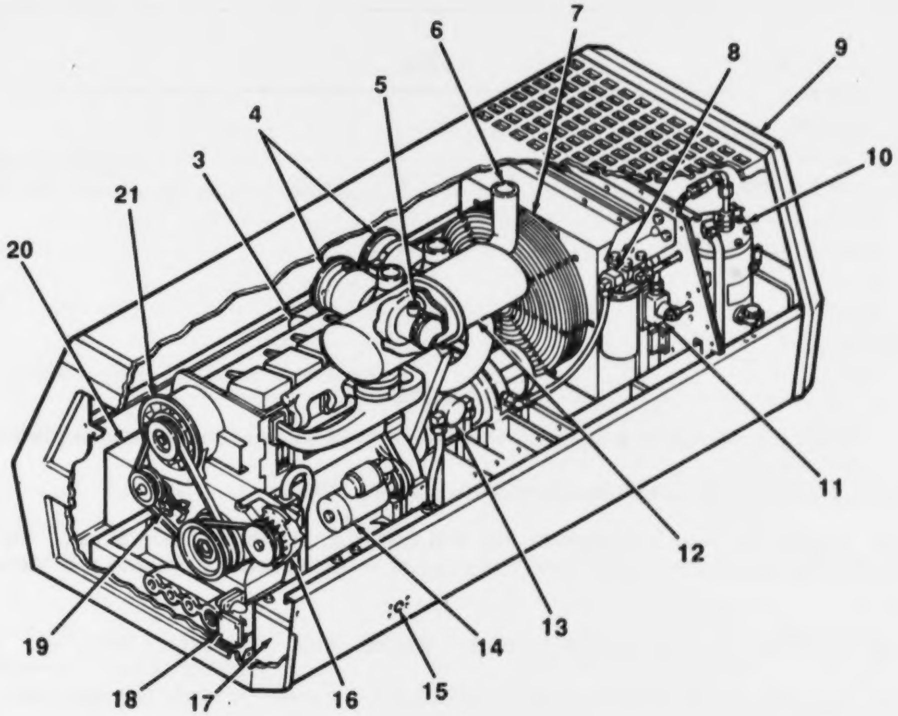
1-12. GENERAL (Con't).



3. Fuel Tank Filler Cap
4. Air Cleaner Assembly
5. Restriction Indicator
6. Exhaust Pipe
7. Oil Cooler Fan
8. Oil Filter Assembly
9. Housing
10. Oil Separator
11. Oil Temperature Bypass Valve
12. Muffler
13. Automatic Blowdown Valve
14. Starter Motor and Solenoid
15. Slave Receptacle
16. Alternator
17. Storage Batteries
18. Minimum Pressure and Service Valve
19. Belt Break Switch
20. Fuel Tank
21. Engine Cooling Blower

1-13. ENGINE.

a. The engine for this unit is a Deutz, direct injection, air-cooled, four-stroke diesel.

b. The strokes of a four-cycle diesel engine are as follows:

(1) **Intake Stroke.** Air enters the cylinder through the air inlet valves and is drawn into the cylinder by the suction force created by the piston as it moves from a top position to a bottom dead center position.

(2) **Compression Stroke.** After the piston has passed bottom dead center, the air inlet valve closes. As the piston moves upward, the air is compressed and reaches a temperature of 1000°F–1200°F (538°C–649°C). Shortly before the piston reaches top dead center, fuel injection into the cylinder is started.

(3) **Power Stroke.** The atomized fuel spray injected into the cylinder is immediately ignited by the high temperature of the compressed hot air, and burning continues as the hot gases of combustion expand and force the piston downward. Combustion proceeds until the end of fuel injection. Shortly before the piston reaches bottom dead center, the exhaust valve opens.

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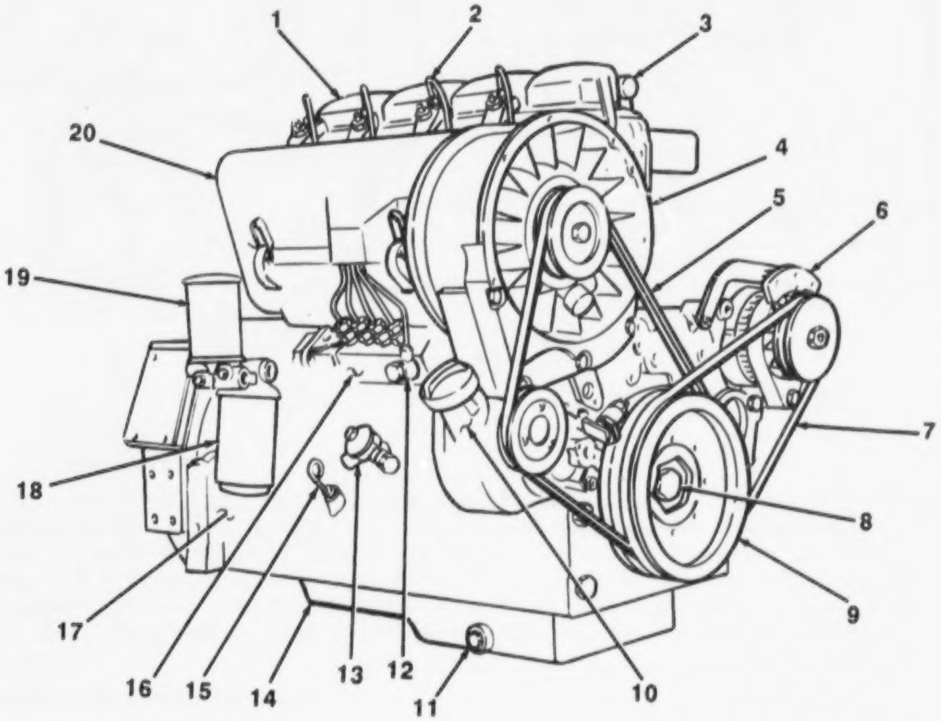
1-13. ENGINE (Con't).

(4) **Exhaust Stroke.** As the piston moves upward on the fourth stroke, it forces the burned and expanded gases from the cylinder through the open exhaust valve, which closes just before the piston reaches top dead center. The air inlet valve opens and the cycles are repeated (i.e., there are two down and two up strokes in the cycle).

c. The following illustration shows the location of the major engine components.



1. Rocker Chamber Cover
2. Injection Line
3. Intake Manifold
4. Cooling Blower
5. Cooling Blower V-belt
6. Alternator
7. Alternator V-belt
8. Antifatigue Bolt (securing V-belt pulley to crankshaft)
9. V-belt Pulley
10. Oil Filler Neck
11. Oil Drain Plug
12. Overflow Line
13. Metering Fuel Pump
14. Oil Pan
15. Oil Dipstick
16. Injection Pump
17. Crankcase
18. Oil Filter Element
19. Fuel Filter Element
20. Removable Air Duct

1-14. FUEL SYSTEM.

a. The engine has a direct injection fuel system, which means that fuel is injected directly into the combustion chamber.

b. The following schematic shows the fuel flow through the system.

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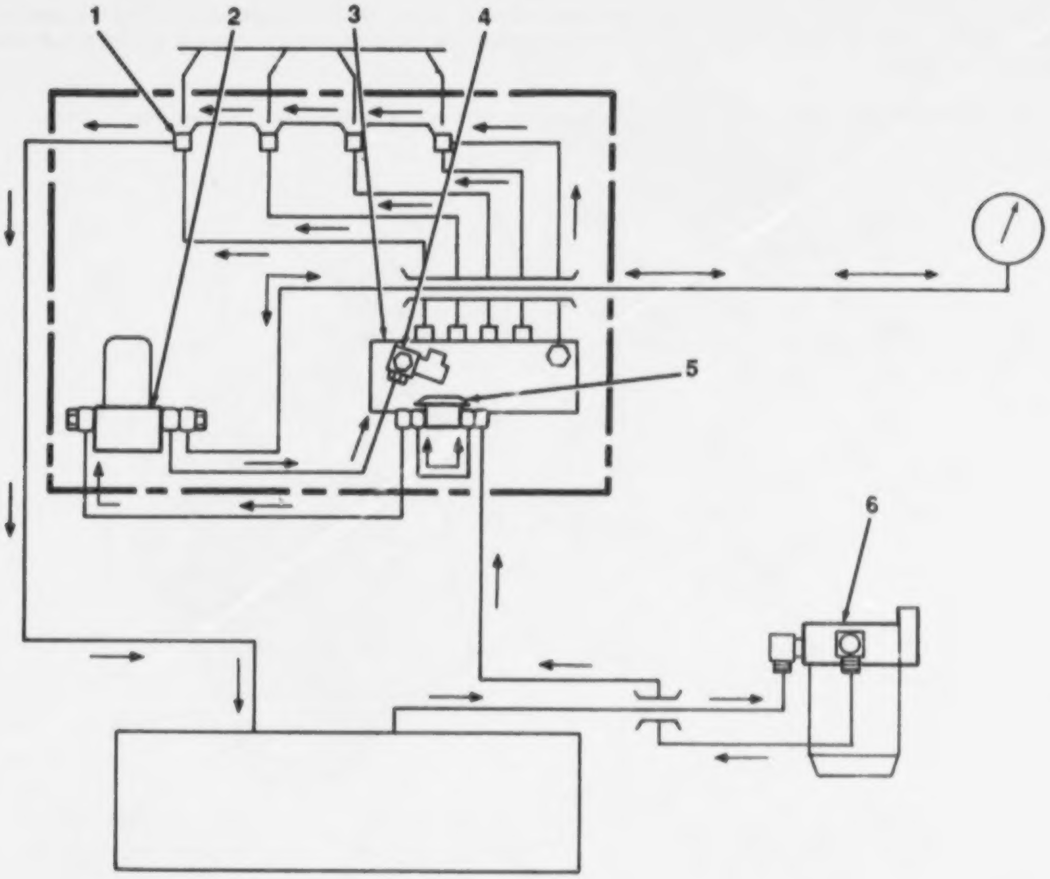
1-14. FUEL SYSTEM (Con't).



1. Injector
2. Fuel Filter
3. Injection Pump
4. Solenoid Valve
5. Metering Fuel Pump
6. Fuel/Water Separator

1-15. AIR COMPRESSOR.

a. The air compressor is an enclosed helical, single stage, positive displacement-type.

b. Air is compressed when two oil-flooded helical rotors (male and female) on parallel shafts mesh in an enclosed housing with air inlet and outlet ports located on opposite ends of the housing. The male rotor has four lobes, 90° apart, and the female rotor has six grooves, 60° apart. The grooves of the female rotor mesh with and are driven by the male rotor. Thrust bearings at the rear of the shafts prevent lengthwise movement of the rotors. When the engine turns the compressor, the rotors mesh and free air is drawn into the cavities between the male rotor lobe and the grooves of the female rotor. The air is trapped in these cavities and follows the direction of rotation of each rotor. When the air inlet port closes, the compression cycle begins and the trapped air is compressed and directed to the opposite or discharge side of the rotor housing. In a metered flow, cooled lubricating oil is injected into the rotor housing so that it moves with the air being compressed. This removes much of the heat of compression and causes the air discharge temperature to be lower. From the discharge port, the compressed air and lubricating oil go to the oil separator which serves as an oil and air storage reservoir. For a further description of the lubrication system, see paragraph 1-16.

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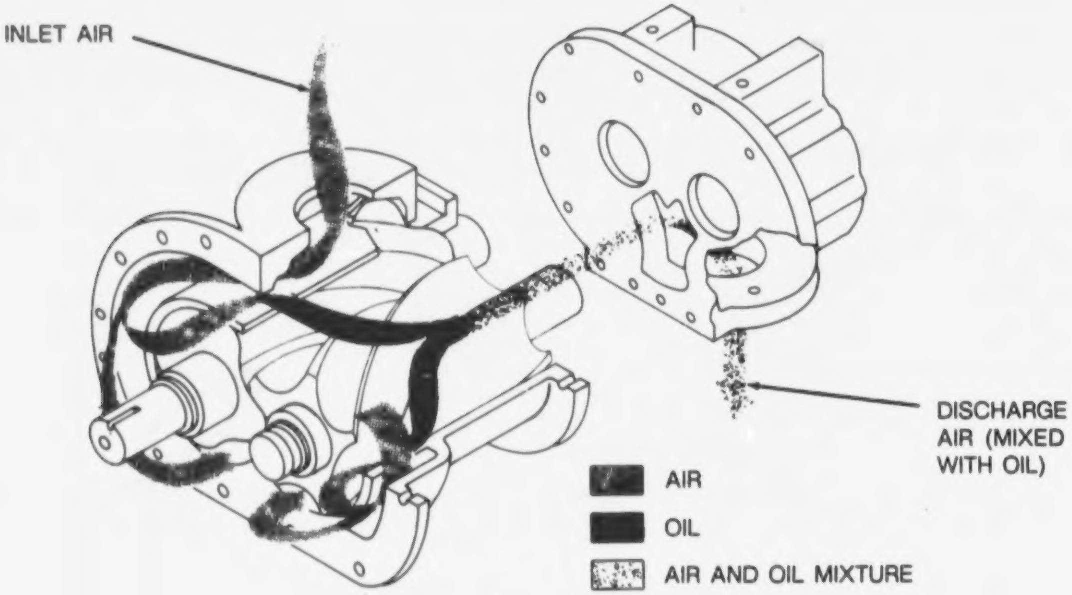
1-15. AIR COMPRESSOR (Con't).



c. Air flow through the compressor can be regulated from full capacity to zero capacity depending on the demand placed on the unit. Reduction to zero capacity is done by the air inlet unloader valve. The air inlet unloader valve, mounted on the rotor housing intake port, controls the capacity of the compressor by a throttling affect. This is done with a calibrated spring which maintains sufficient pressure on the diaphragm, preventing movement of the air actuating cylinders to slow the engine to idle and the unloader valve to close off air to the compressor. Discharge air pressure can be regulated between 75-100 psi (517-690 kPa) by adjusting the regulator valve.

d. Compressor Lubricating Oil.

(1) The compressor lubricating oil both lubricates and cools. The oil is forced from the oil separator tank, by system pressure, to the oil cooler. The cooler is located at the compressor end of the unit so that the heat exchanger fan cools the compressor lubricating oil.

(2) When the compressor is operating at low capacity, some oil may bypass the cooler through a thermostatically controlled bypass valve. This valve bypasses varying amounts of oil, depending upon the temperature, until the oil being circulated reaches a temperature of 185°F (85°C), thereby maintaining a higher average oil temperature and reducing the possibility of water vapor condensation in the oil.

(3) From the oil cooler, the cooled oil is directed through the oil filter, then to the rotor bearings, and, in metered amounts, directly into the rotor housing. All of the oil introduced mixes with and passes on with the air being compressed, removing much of the heat of compression.

(4) On its way to the final discharge connection, the air passes through the piping to the oil separator where the oil is removed from the air and collects in the oil storage reservoir.

(5) Primary separation of the oil takes place because of the change in the velocity and direction as the compressed air enters the oil separator.

(6) Secondary separation of the oil takes place in the separator element, which is located within the oil separator. The oil separator consists of a disposable element made of materials designed to remove finely divided oil droplets which remain in the compressed air as it passes through the oil separator element.

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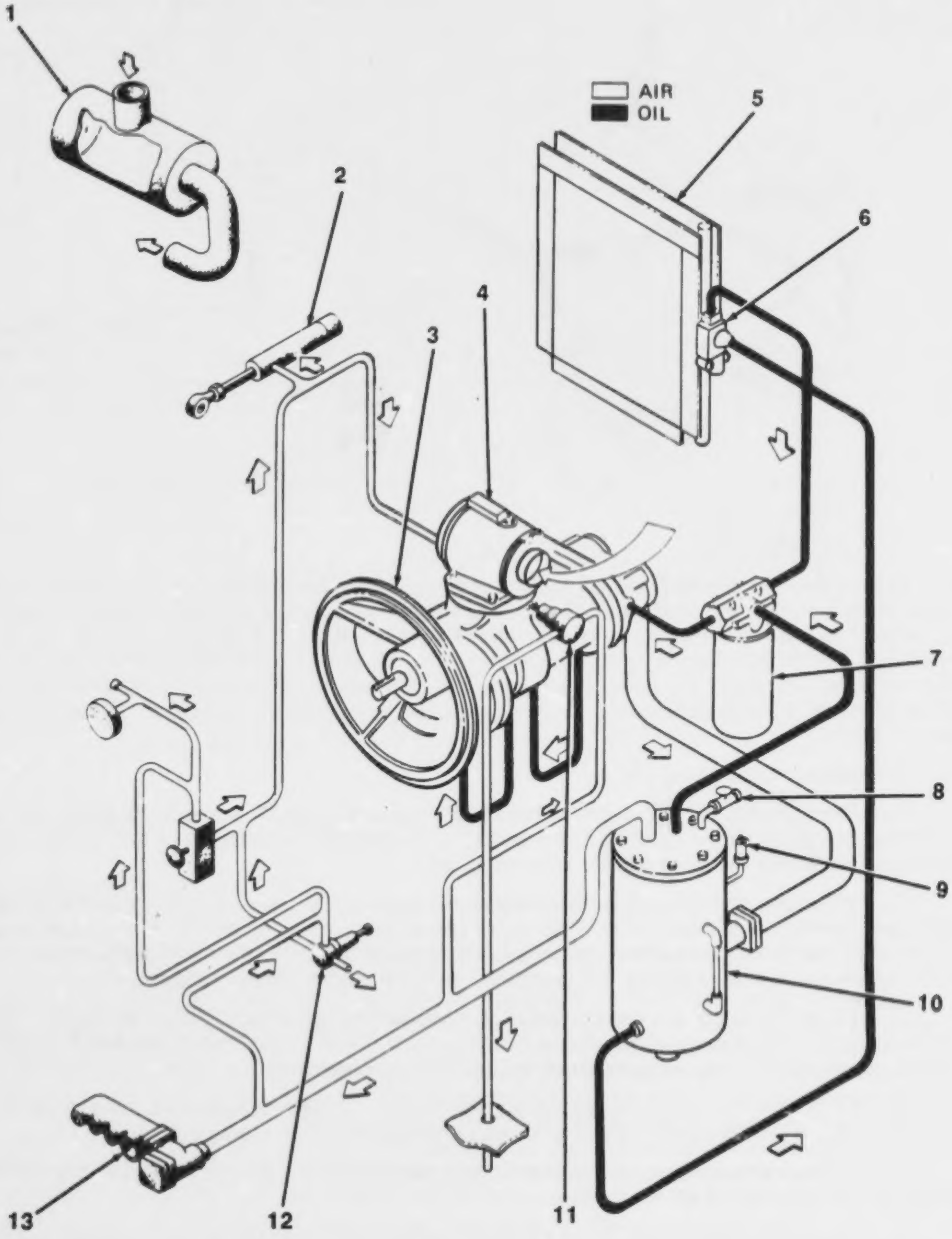
1-16. LUBRICATION SYSTEM.

Components of the compressor unit's air and oil flow.

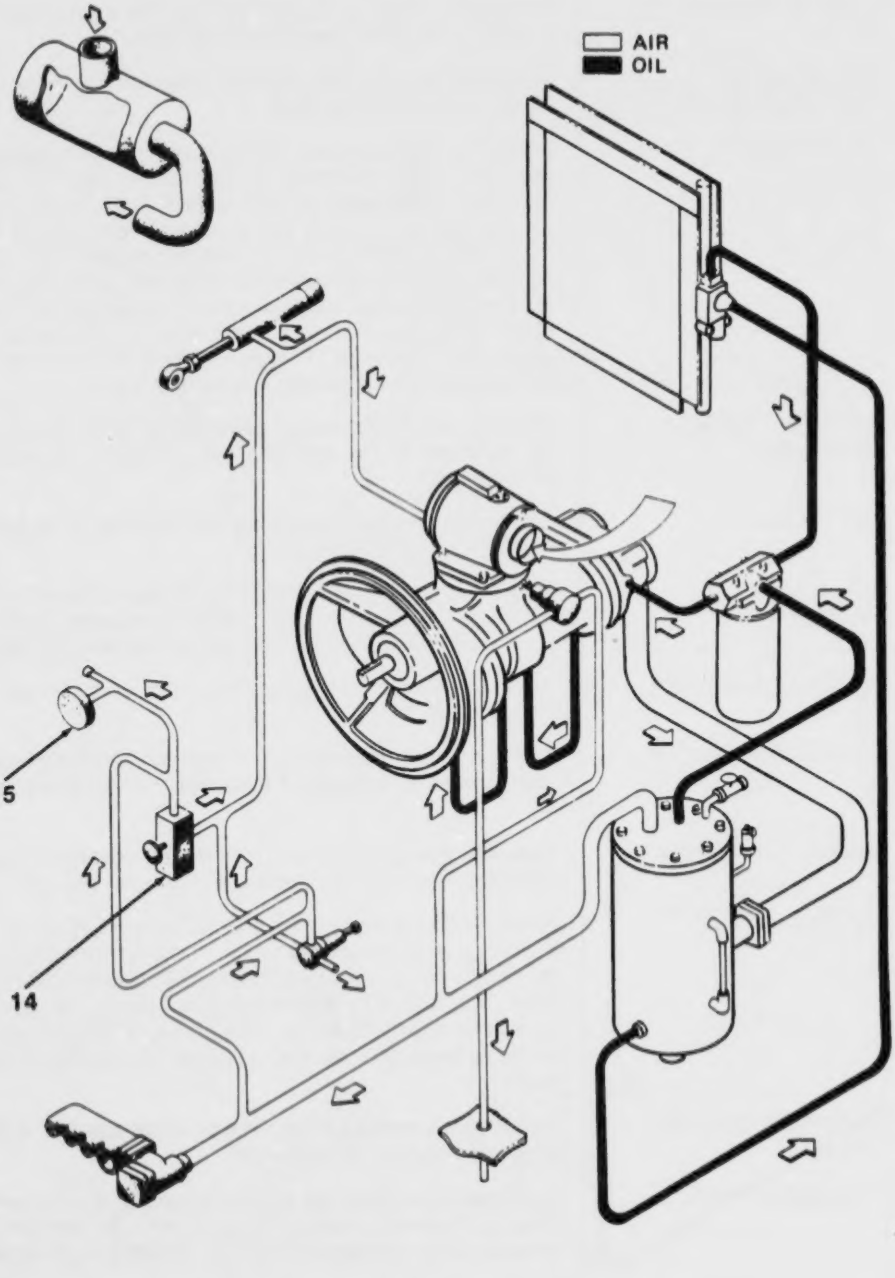


TA505392

1-16. LUBRICATION SYSTEM (Con't).

Key	Component	Function
1	Inlet Air Cleaner	Prevents foreign particles such as dirt and water from being inducted into the compressor air inlet.
2	Air Actuating Governor Control	Acts in unison with the pressure regulator to adjust the engine governor to load demand.
3	Compressor	A positive displacement, helical-type compressor consisting of two, one-piece meshing helical rotors within a compression chamber. Operating at high speed within a tight casing, the rotors draw air in from the top inlet, compress it axially, and discharge it from the bottom at the opposite end. Cooled oil is injected into the compression chamber under controlled pressure to cool the air, seal the rotor clearances, and lubricate the rotor surfaces. Pressure lubrication is also supplied to the gears and bearings. The oil which mixes with the air during compression passes into the oil separator.
4	Unloader Valve Assembly	Controls the compressor capacity by throttling the volume of air admitted to the compressor. Unloader valve assembly is air-operated.
5	Oil Cooler	Cools compressor lubricating and cooling oil to prevent overheating of the compressor.
6	Oil Temperature Bypass Valve	Regulates cooling and lubricating oil flow to partially bypass the oil cooler when oil is cold. Valve modulates oil flow between bypass and oil cooler to maintain an optimum oil temperature.
7	Oil Filter Assembly	Removes foreign particles from the compressor lubricating and cooling oils.
8	Manual Blowdown Valve	The hand-operated valve can relieve the oil separator system of all pressure. Use only if the safety relief valve does not work.
9	Safety Relief Valve	Releases compressed air from the oil separator system to the atmosphere when air pressure exceeds 150 psi (1034 kPa).
10	Oil Separator	Receives compressed air and oil mist from the compressor. Most of the oil immediately falls to the bottom of the oil separator tank. Any oil remaining in the air is removed by the oil separator. In addition to lubricating and cooling oils, the oil separator stores compressed air. The pressure of the compressed air in the oil separator tank is indicated by the discharge pressure gage.
11	Automatic Blowdown Valve	Vents compressed air from the oil separator to the atmosphere when the engine is turned off.
12	Ragulating Valve	Automatically regulates engine speed and air volume passing through the inlet unloader valve by sensing air pressure in the oil separator system and acting pneumatic cylinder.
13	Minimum Pressure and Service Valve	Ensures that excess lubricating and cooling oil is not drawn into the air service lines by closing automatically when the pressure in the oil separator system drops below 75 psi (517 kPa).

1-16. LUBRICATION SYSTEM (Con't).



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1-16. LUBRICATION SYSTEM (Con't).

Key	Component	Function
14	Service-Air Valve	A two-way valve that reduces load requirements on the engine during start-up, thereby permitting engine warm-up before loading the compressor to full capacity.
15	Discharge Pressure Gage	Located in the indicator panel to identify air pressure in the oil separator system. Normal reading should be 80–120 psi (552–827 kPa), depending on the speed and pressure regulator adjustment.

CHAPTER 2
OPERATING INSTRUCTIONS

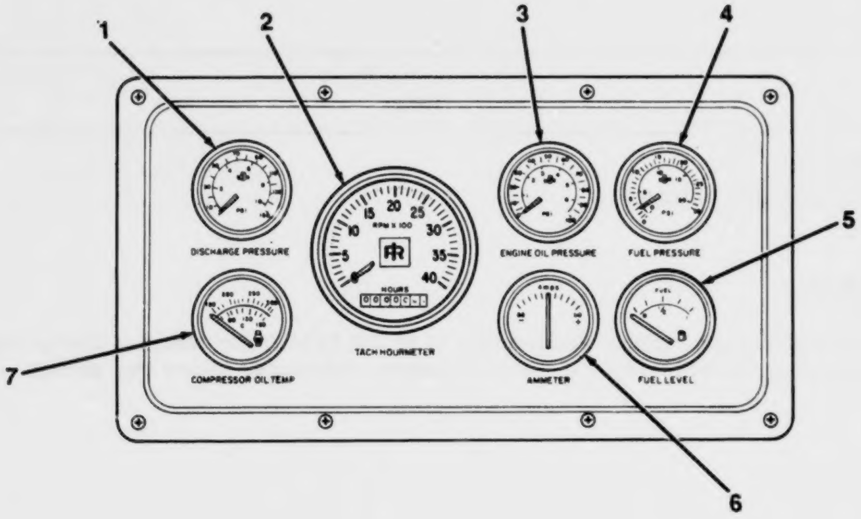
Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

Paragraph Number	Title	Page Number
2-1	General	2-1
2-2	Controls and Indicators	2-2

2-1. GENERAL.

This section shows the location and function of all 250 CFM Trailer-Mounted Compressor Unit operator controls and indicators. Before operating the compressor, thoroughly review this section.

2-2. CONTROLS AND INDICATORS.



Key	Control or Indicator	Function
1	Discharge Pressure	Indicates the pressure of air leaving the compressor. Should be 80-120 psi (552-827 kPa).
2	Tach/Hourmeter	The tachometer portion indicates the engine speed in revolutions per minute (rpm). The hourmeter portion of this gage indicates and records the total number of hours of actual operation.
3	Engine Oil Pressure	Indicates engine oil pressure. Normal engine oil pressure is 60-80 psi (414-552 kPa).
4	Fuel Pressure	Indicates engine fuel pressure. Normal fuel pressure is 4-6 psi (28-41 kPa).
5	Fuel Level	Indicates how much fuel is in the fuel tank.
6	Ammeter	Indicates if the alternator function is normal. Needle should indicate on the positive (+) side of "0" while the compressor unit is running.
7	Compressor Oil Temp	Indicates compressor oil temperature. Should indicate 150°-230°F (66°-110°C).

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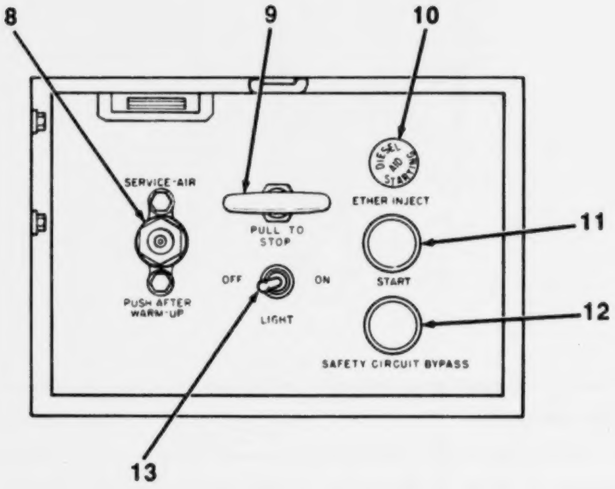
2-2. CONTROLS AND INDICATORS (Con't).



Key	Control or Indicator	Function
8	Service-air/Push After Warm Up	This button controls the service air valve and allows the engine to warm up with a minimum load. This button should be pressed only after the engine is warm. The valve will reset automatically when the engine is turned off.
9	Pull To Stop	Stops the engine when pulled.
10	Ether Inject	Provides the engine with a burst of ether during cold weather start.
11	Start	Starts the engine.
12	Safety Circuit Bypass	Allows the safety circuit to be bypassed when starting the engine.
13	Light On/Off Switch	Controls the panel light above the indicator panel.

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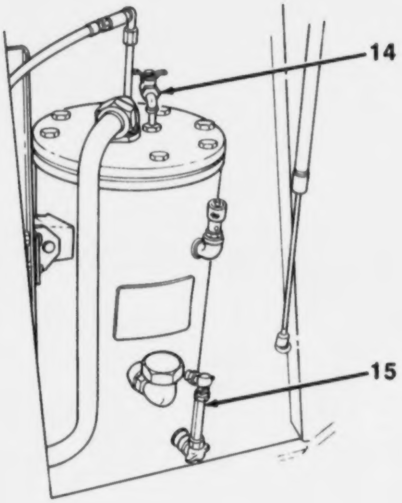
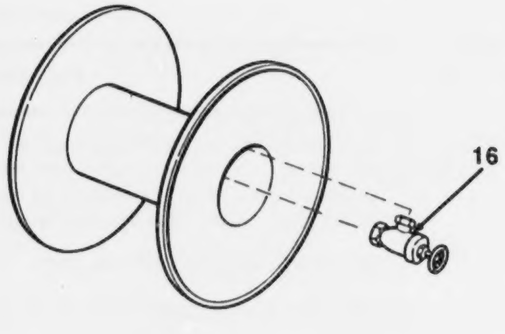
2-2. CONTROLS AND INDICATORS (Con't).



Key	Control or Indicator	Function
14	Manual Blowdown Valve	Relieves pressure on the oil separator system when the unit is shut down. Usually, this valve will only be used if the automatic blowdown valve fails to operate normally.
15	Compressor Oil Level Sight Tube	Indicates level of oil in compressor. Oil level must be present in sight tube before operating compressor unit.



Key	Control or Indicator	Function
16	Hose Reel Valve	Admits compressed air to the hose when opened. This valve can be found on both hose reels.

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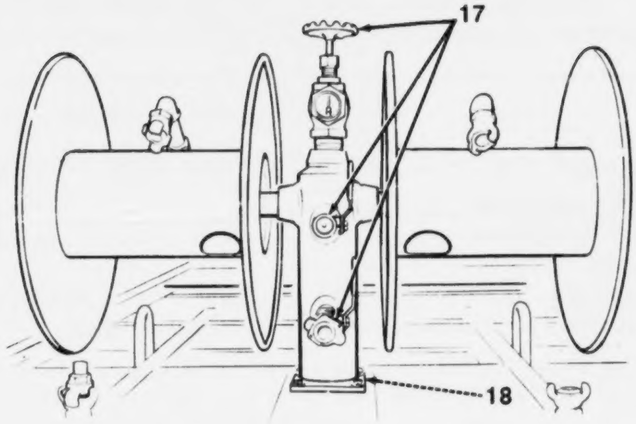
2-2. CONTROLS AND INDICATORS (Con't).



Key	Control or Indicator	Function
17	Manifold Valves	Provide additional hookups and controls for more air hoses.
18	Service Air Manifold Drain	Removes built-up moisture in service air manifold.

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Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Paragraph Number	Title	Page Number
2-3	General	2-6
2-4	Intervals	2-6
2-5	Reporting Repairs	2-6
2-6	General PMCS Procedures	2-6
2-7	Specific PMCS Procedures	2-7
2-8	Cleaning Agents	2-7
2-9	Leakage Definitions	2-8
Table 2-1	Operator Preventive Maintenance Checks and Services (PMCS)	2-9

2-3. GENERAL.

To ensure that the 250 CFM Trailer-Mounted Compressor Unit is ready for operation at all times, it must be inspected on a regular basis so that defects can be found before they result in serious damage, equipment failure, or injury to personnel. This section contains systematic instructions on inspections, adjustments, and corrections to be performed by the operator.

2-4. INTERVALS.

Perform PMCS, found in Table 2-1, at the following intervals:

- Perform Before (B) PMCS just before operating the compressor.
- Perform During (D) PMCS while operating the compressor.
- Perform After (A) PMCS right after operating the compressor.
- Perform Weekly (W) PMCS once each week.

2-5. REPORTING REPAIRS.

All defects which the operator cannot fix must be reported on DA Form 2404, *Equipment Inspection and Maintenance Worksheet*, immediately after completing PMCS. If a serious problem is found, IMMEDIATELY report it to your supervisor.

2-6. GENERAL PMCS PROCEDURES.

NOTE

While performing PMCS procedures, keep in mind all WARNINGs and CAUTIONs.

a. While performing specific PMCS procedures, ensure that items are correctly assembled, secure, serviceable, adequately lubricated, and not worn or leaking as defined below:

(1) An item is CORRECTLY ASSEMBLED when it is in proper position and all parts are present.

(2) Wires, nuts, hoses, fittings, or attaching hardware are SECURE when they cannot be easily removed by hand or by wrench.

(3) An item is SERVICEABLE if it is not worn beyond repair or likely to fail before the next scheduled inspection.

2-6. GENERAL PMCS PROCEDURES (Con't).

(4) An item is ADEQUATELY LUBRICATED if it has been lubricated in accordance with LO 5-4310-452-12.

(5) An item is WORN if there is too much play between joining parts, if an item does not meet the wear specifications provided, or when WARNING, CAUTION, and data stencil markings, plates, or decals are not legible.

(6) For LEAKAGE definitions, see paragraph 2-9.

b. Perform inspections of welds, electrical conduits, tubing, and hoses as described below:

(1) Check for loose or chipped paint, rust, or gaps where parts are welded together. If a bad weld is found, notify your supervisor.

(2) Look for cracked, frayed, loose, or broken electrical conduits, tubing, and hoses. Repair or report unserviceable items.

(3) Check for wear, damage, and leaks, and ensure that couplings and fittings are tight. Wet spots indicate leaks, but a stain around a coupling or fitting can also mean a leak (see paragraph 2-9). If wear, damage, or leaks are found, notify your supervisor.

c. When the instruction "clean" appears in a procedure, use the guidelines found in paragraph 2-8. Even if a procedure does not specify cleaning, be aware of any buildup of dirt, grease, oil, and debris. Clean any such buildup using cleaning agents authorized by Appendix E.

d. If your compressor unit is new, or if the engine has recently been overhauled, stop the unit after 20 minutes of operation and have organizational maintenance adjust the V-belts to the proper tension.

2-7. SPECIFIC PMCS PROCEDURES.

a. Operator PMCS are provided in Table 2-1. Always perform PMCS in the order listed. Once it becomes a habit, you'll spot anything wrong in a hurry. If anything wrong is discovered through PMCS, perform the appropriate troubleshooting task in Chapter 3, Section II. If any component or system is not serviceable, or if a given service does not correct the problem, notify your supervisor.

b. The PMCS procedures in Table 2-1 are performed at four intervals: Before, During, After, and Weekly. Before performing PMCS, read all checks required for the applicable interval. Have several clean rags (Item 11, Appendix E) handy. Perform ALL the inspections at the applicable interval.

c. The columns in the PMCS table are defined below:

(1) **Item No.** Provides a logical sequence for PMCS to be performed and is used as a source number when recording PMCS results on DA Form 2404.

(2) **Interval.** Specifies when PMCS is to be performed.

(3) **Item To Be Inspected/Procedure.** Lists system and common names of items that are to be inspected. Included in this column are specific servicing, inspection, replacement, or adjustment procedures to be followed.

(4) **Equipment Is Not Ready/Available If.** Explains when the compressor is not capable of safe operation.

2-8. CLEANING AGENTS.

a. Keeping the compressor unit clean is an important part of PMCS. Equipment that is covered with surface dirt, grease, and oil cannot be properly inspected.

2-8. CLEANING AGENTS (Con't):

b. Keep excess lubricants away from exterior parts that do not require lubrication.

c. Use only those authorized cleaning solvents or agents listed in Appendix E.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F–130°F (38°C–59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

d. Use dry cleaning solvent (Item 3, Appendix E) to clean grease, oil, or rust from metal parts. After parts are cleaned, rinse and dry thoroughly. Apply light lubricating oil (Item 9, Appendix E) to all polished metal surfaces to prevent rusting.

2-9. LEAKAGE DEFINITIONS.

a. It is important to know how fluid leakage affects the status of the compressor unit. An operator must know the following types/classes of leaks in order to determine whether the compressor unit is operational. Learn these leakage definitions. When in doubt, notify your supervisor.

Leakage Definitions for Operator PMCS

Class I	Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
Class II	Leakage of fluid great enough to form drops, but not great enough to cause drops to drip from item being inspected.
Class III	Leakage of fluid great enough to form drops that fall from the item being inspected.

b. Equipment operation is allowed with minor (Class I or II) leakage. Of course, fluid levels in an item/system affected with such leakage must be checked more frequently than required in PMCS. When in doubt, notify your supervisor.

c. Class III leaks must be IMMEDIATELY reported to your supervisor.

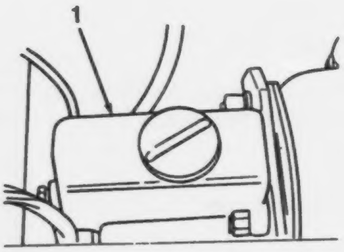
Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS).

B - Before D - During A - After W - Weekly

ITEM NO.	INTERVAL				ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed.	Equipment Is Not Ready/Available If:
	B	D	A	W		
					NOTE • Perform these checks in the order listed, within the designated interval, as you walk around the compressor unit. • Perform Before (B) and Weekly (W) PMCS if: a. You are the assigned operator and have not operated the compressor unit since the last weekly check. b. You are operating the compressor for the first time. • If the compressor unit must be kept in continuous operation, check and service only those items that will not disturb operation. Complete the remaining checks and services when the unit can be shut down.	
1					VEHICLE EXTERIOR	
	●				a. Check for fluid leakage or appearance of fluid leakage.	Any Class III leaks are found.
	●				b. Visually check for damaged piping or hoses, and loose, missing, or damaged parts.	Piping or hoses are leaking or broken. Parts are missing or damaged.
	●				c. Operate lights.	
	●				d. Leveling jacks operate properly. If leveling jacks are missing or damaged, notify your supervisor.	
2					TIRES	
	●				Check for excessive wear, cuts, cracks, abrasions, and low or flat tires. Ensure that tires are inflated to 60 psi (448 kPa).	
3					FUEL/WATER SEPARATOR	
	●		●		Check for water in sightbowl. If water is visible, service fuel/water separator (see paragraph 3-6).	Two or more tires are flat or missing.
4					FUEL TANK LEVEL	
	●				Check fuel level on fuel level gage.	Fuel tank is empty.

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) (Con't).

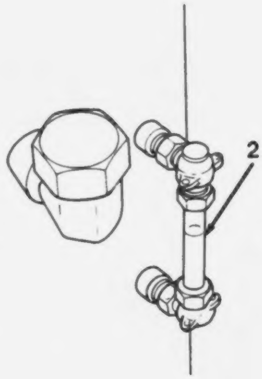
B - Before **D - During** **A - After** **W - Weekly**

ITEM NO.	INTERVAL				ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed.	Equipment Is Not Ready/Available If:
	B	D	A	W		
5					ENGINE CRANKCASE	
					CAUTION **To prevent engine damage, engine oil level should be checked twice daily until engine exceeds 200 hours of operation.** **NOTE** **Compressor unit must be level to perform this check.**	
	●				Check engine oil level on dipstick. Oil level should be between "ADD" and "FULL" marks.	Oil level is below "ADD" mark.
6					AIR CLEANER ASSEMBLY	
	●				Visually check restriction indicator for a green condition. If indicator shows a red condition, clean air cleaner (see paragraph 3-4).	
7					DRAWBAR	
	●				Visually check for excessive wear, cracks, or broken parts. Check that lunette mounting bolts are not loose, missing, or bent.	Drawbar is cracked or broken. Nuts or bolts are loose, bent, or missing.
8					BRAKES, AIR LINE/HOSES	
	●				Check air line/hoses for obvious damage.	Air line/hose(s) are broken or missing.
9					BRAKE MASTER CYLINDER FLUID RESERVOIR	
	●				Check brake fluid level in reservoir (1). Level should be within ¼ in. (6 mm) of top. If level is low, notify your supervisor.  	

TA505398

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) (Con't).

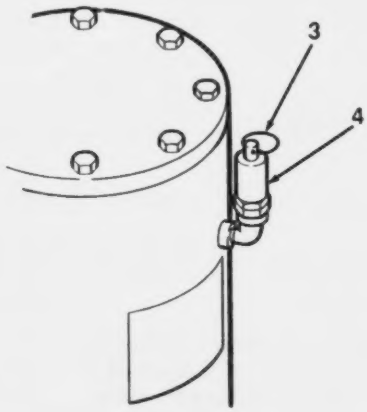
B - Before D - During A - After W - Weekly

ITEM NO.	INTERVAL				ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed.	Equipment Is Not Ready/Available If:
	B	D	A	W		
10					COMPRESSOR OIL LEVEL **WARNING** **Compressor lubrication/cooling system is under pressure. DO NOT remove drain plug or filler plug from compressor lubricating/cooling system while under pressure or injury to personnel may result. First open manual blowdown valve as a safety precaution.**	
	●	●			Check compressor oil level on sight tube (2). Oil must be present in sight tube when unit is running. If oil is not present, notify your supervisor.  	No oil is present in sight tube.
11					DRIVE BELTS **NOTE** **If unit is new or engine has been overhauled, unit should be shut down after 20 minutes of operation and a belt adjustment check should be performed by organizational maintenance.**	
	●				a. Visually check for broken or missing belts.	Belts are broken or missing.
	●				b. Press down on belts with your thumb and measure the deflection of belts with rule. If belts deflect more than 0.4-0.6 in. (10-15 mm), or are cracked or deteriorated, notify your supervisor.	

TA505399

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) (Con't).

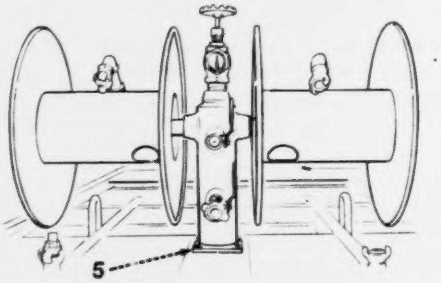
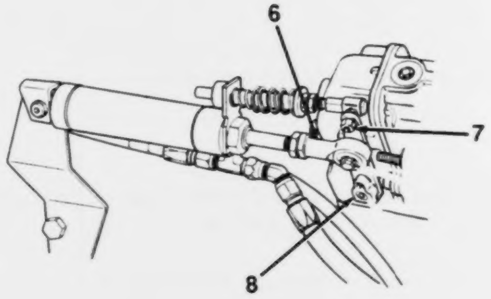
B - Before D - During A - After W - Weekly

ITEM NO.	INTERVAL				ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed.	Equipment Is Not Ready/Available If:
	B	D	A	W		
12					**INSTRUMENTS AND GAGES**	
					Check for proper indication and operation.	Any gage inoperative or not within limits.
		●			Fuel pressure: 4-6 psi (28-41 kPa)	
		●			Oil pressure: 60-80 psi (414-552 kPa)	
		●			Discharge pressure: 80-120 psi (552-827 kPa)	
		●			Ammeter: Should indicate positive (+) charge	
		●			Tachometer: 1400 rpm idle to 2500 rpm max	
		●			Compressor temperature: 150°F-230°F (66°C-110°C) after 10 minutes of operation	
13					**SAFETY RELIEF VALVE**	
		●			Pull up on ring (3) of safety relief valve (4). Safety relief valve should open and allow air pressure to escape. If valve will not open, notify your supervisor.  	
14					**SERVICE AIR MANIFOLD**	
			●		Open and drain moisture from service air manifold drain (5).	

TA505400

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) (Con't).

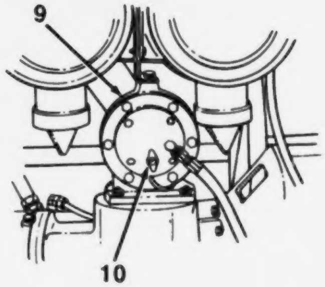
B - Before D - During A - After W - Weekly

ITEM NO.	INTERVAL				ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed.	Equipment is Not Ready/Available If:
	B	D	A	W		
						
15				●	**ENGINE THROTTLE CONTROL** Lubricate rod end bearing (6) with grease (Item 5, Appendix E). Lubricate linkage points (7 and 8) with engine oil (Item 8, Appendix E). Wipe off excess oil with clean rag (Item 11, Appendix E). 	

TA505401

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) (Con't).

B - Before D - During A - After W - Weekly

ITEM NO.	INTERVAL				ITEM TO BE INSPECTED PROCEDURE: Check for and have repaired, filled, or adjusted as needed.	Equipment Is Not Ready/Available If:
	B	D	A	W		
16					UNLOADER VALVE ASSEMBLY	
					WARNING Unloader valve assembly may be under pressure. Protect eyes and skin from unloader draincock opening during draining procedure.	
				●	During compressor warm-up and before service air button is pushed to build air pressure, open draincock (10) and drain moisture from unloader valve assembly (9).	
17					STORAGE BATTERY	
					WARNING • Storage battery acid (electrolyte) is extremely dangerous. Always wear goggles and rubber gloves when performing battery checks or inspections. Serious injury to personnel will result if battery acid contacts skin or eyes. • DO NOT perform storage battery checks or inspections while smoking or near fire, flames, or sparks. Storage batteries may explode, causing serious injury or death to personnel. NOTE If compressor unit has a maintenance-free storage battery, perform only step b.	
				●	a. Check electrolyte level in storage batteries. If electrolyte level is below top of plates, notify your supervisor.	
				●	b. Check storage battery and storage battery box for corrosion and obvious damage. If corrosion or damage is found, notify your supervisor.	Storage battery is missing or engine will not crank.

TA505402

Section III. OPERATION UNDER USUAL CONDITIONS

Paragraph Number	Title	Page Number
2-10	General	2-15
2-11	Preparation for Use	2-15
2-12	Starting Under Usual Conditions	2-15
2-13	Stopping the Unit	2-18
2-14	During Operation	2-20
2-15	Coupling Unit to Towing Vehicle	2-20
2-16	Uncoupling Unit from Towing Vehicle	2-22

2-10. GENERAL.

a. This section contains instructions for safely operating the 250 CFM Trailer-Mounted Compressor Unit under usual conditions. Unusual operating conditions are defined and described in Section IV of this chapter.

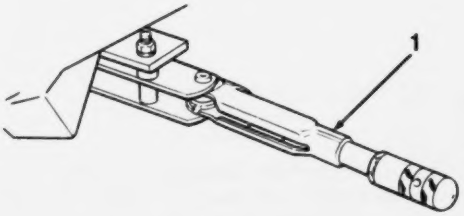
b. Perform all Before (B) PMCS in Table 2-1 before operating the compressor unit.

2-11. PREPARATION FOR USE.

DA Form 2258, attached to the unit, contains the checklist of items that must be accomplished before use. All items on DA Form 2258 must be properly completed before the compressor unit can be safely operated.

2-12. STARTING UNDER USUAL CONDITIONS.

a. Set parking brake (1).



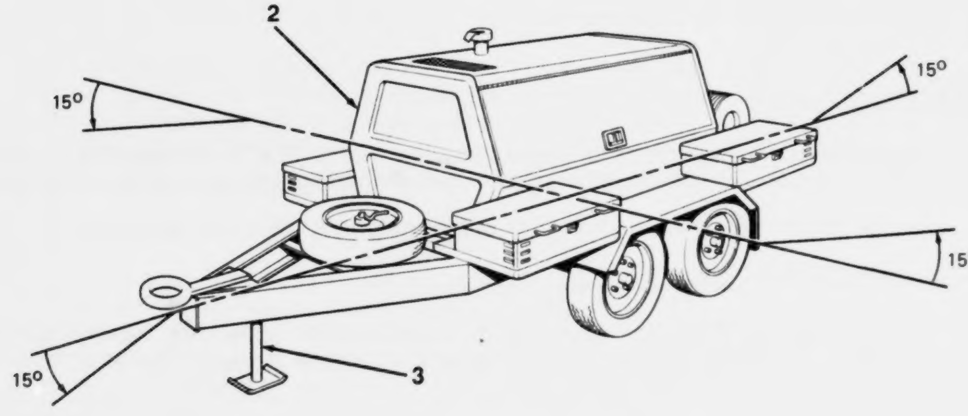
TA505403

2-12. STARTING UNDER USUAL CONDITIONS (Con't).

CAUTION

Do not operate the compressor unit more than 15° out-of-level, either end-to-end or side-to-side. If the unit is not level, the engine oil will not circulate correctly and may result in severe engine damage.

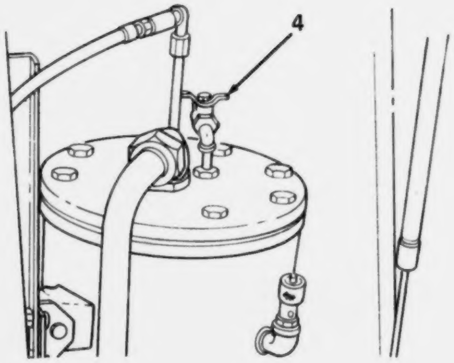
b. Raise or lower front leveling jack (3) until compressor unit (2) is within 15° of level, end-to-end. If compressor unit is not within 15° of level, side-to-side, move compressor unit to a more suitable site.



WARNING

Slowly open manual blowdown valve, being careful to keep face and any bare skin away from valve opening. If this warning is not followed, injury to personnel may result.

c. Open manual blowdown valve (4) to ensure that pressure is relieved from oil separator system. Close manual blowdown valve after relieving pressure.



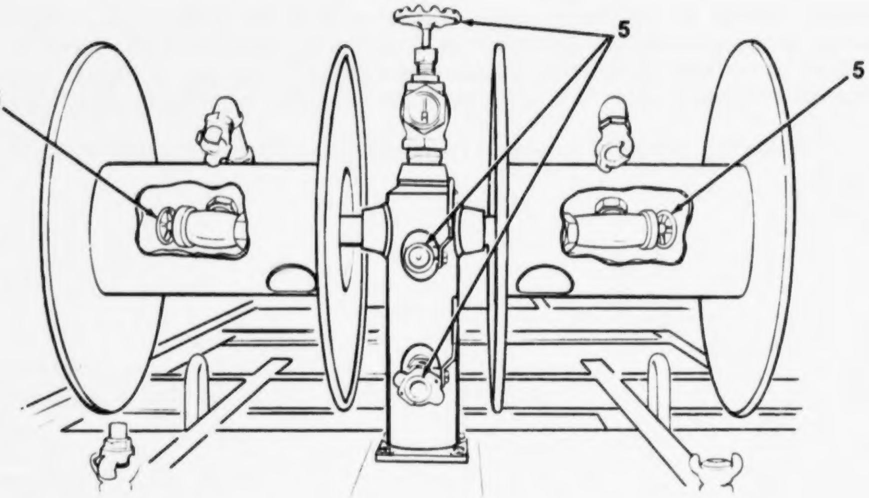
TA505404

2-12. STARTING UNDER USUAL CONDITIONS (Con't).

CAUTION

All service air valves must be closed to allow system to build up enough air pressure to lubricate compressor.

d. Close and secure all service and hose reel valves (5).

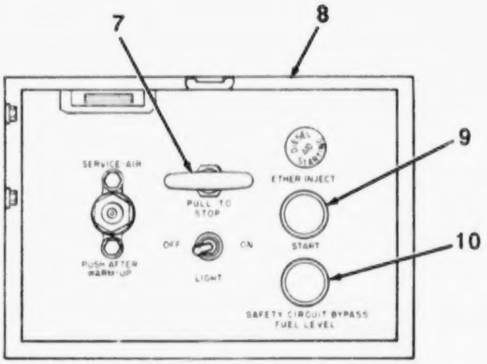


e. Completely push in manual stop handle (7).

CAUTION

Do not operate starting motor more than 30 seconds at a time. Allow starting motor to cool approximately 2 minutes between starting attempts.

f. Simultaneously press START button (9) and SAFETY CIRCUIT BYPASS button (10) on control panel (8).



TA505405

2-12. STARTING UNDER USUAL CONDITIONS (Con't).

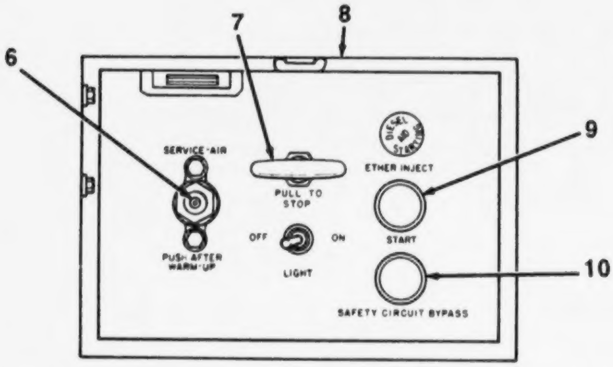
g. When engine starts, release only the START button (9). Continue to press SAFETY CIRCUIT BYPASS button (10) until DISCHARGE PRESSURE gage (11) on indicator panel (12) reaches 40 psi (276 kPa), then release SAFETY CIRCUIT BYPASS button.

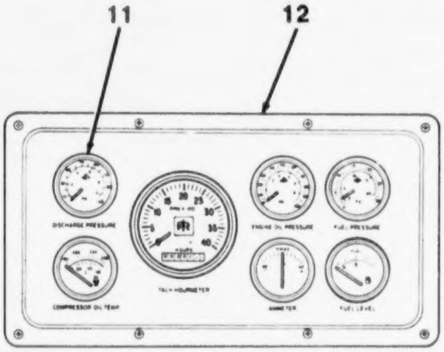
h. When DISCHARGE PRESSURE gage (11) reaches approximately 50 psi (345 kPa) and engine is warm, press SERVICE-AIR button (6).

WARNING

DO NOT connect air discharge with any other unit, of any description, or any other source of compressed air, without first installing a check valve between common header and this unit. If this unit is connected with another unit of higher discharge pressure and capacity, an air line may burst resulting in injury to personnel.

i. When DISCHARGE PRESSURE gage (11) reaches 80-120 psi (552-827 kPa), compressor unit is ready for operation.





2-13. STOPPING THE UNIT.

CAUTION

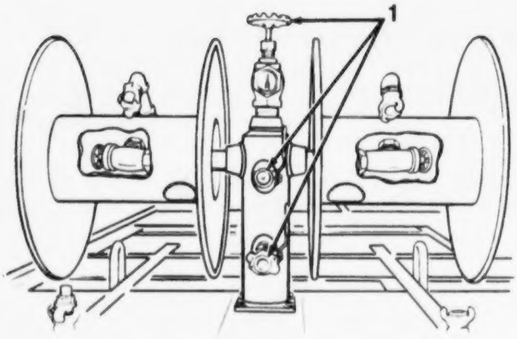
To prevent engine damage, allow engine to idle 3-5 minutes without a load and to cool down before shutdown.

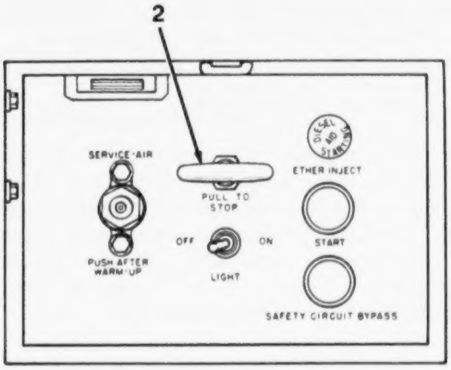
a. Close all service and hose reel valves (1).

b. Pull manual stop handle (2) and hold out until engine completely stops.

TA505406

2-13. STOPPING THE UNIT (Con't).





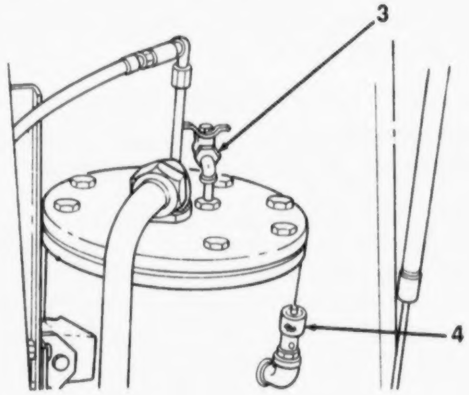
WARNING

Slowly open manual blowdown valve, being careful to keep face and any bare skin away from valve opening. If this warning is not followed, injury to personnel may result.

CAUTION

Never allow unit to sit idle with pressure in oil separator system. If compressor is started with a charged air system, damage to compressor components could result.

c. As soon as engine stops, check automatic blowdown valve (4) to ensure that all pressure is relieved from oil separator system. If automatic blowdown valve fails to operate, use manual blowdown valve (3) to relieve pressure from oil separator system.



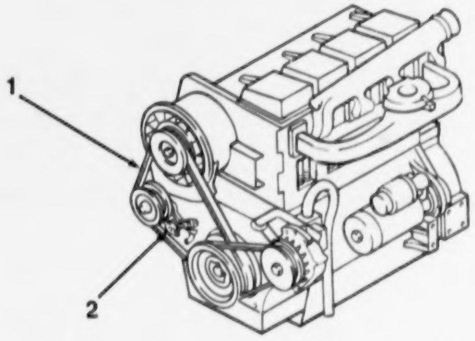
TA505407

2-14. DURING OPERATION.

a. Perform all During (D) PMCS. Become familiar with the normal operation of the compressor unit and with the readings on the indicators. Damage to the equipment, expensive repairs, and downtime can be avoided by an alert operator who can detect a problem in its early stages and help organizational maintenance correct it before it becomes a more serious problem.

CAUTION

Care must be taken to prevent air in fuel system. Never allow fuel tank to run dry. Air in fuel system will cause engine power loss, rough running, or engine to stall and not restart. If engine stalls and will not restart, notify your supervisor to have organizational maintenance bleed fuel system.



b. The compressor unit is equipped with a belt break switch (2) that will stop the engine if an engine V-belt (1) breaks. If the engine stops, check the engine V-belts. If a V-belt is broken, notify your supervisor.

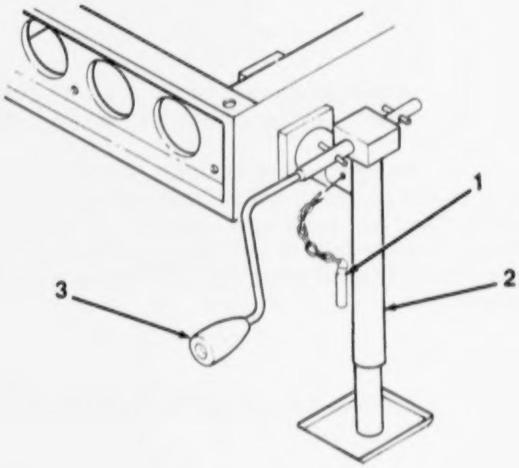
2-15. COUPLING UNIT TO TOWING VEHICLE.

WARNING

The 5-Ton Series trucks are the only vehicles authorized to tow the compressor unit. Unauthorized vehicles may shear drawbar mounting bolts, allowing unit to disengage from towing vehicle resulting in injury or death to personnel.

NOTE

Before compressor unit is towed, ensure that Before (B) PMCS have been performed.



a. Raise both rear leveling jacks (2) with handcrank (3). Remove locking pins (1) and place rear leveling jacks in travel position. Insert locking pins to lock rear leveling jacks in position.

TA505408

2-15. COUPLING UNIT TO TOWING VEHICLE (Con't).

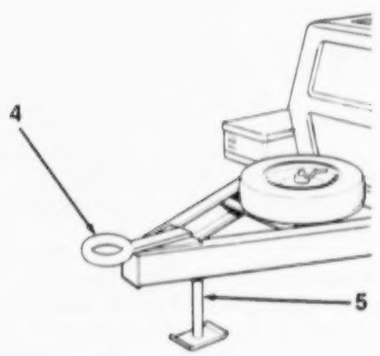
NOTE

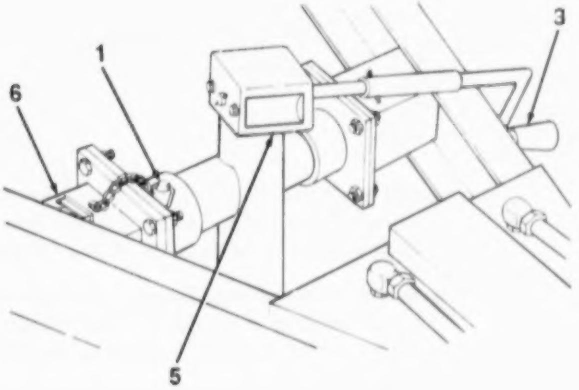
Use front leveling jack to raise or lower drawbar as required.

b. Position towing vehicle so pintle is lined up under drawbar (4).

c. Raise front leveling jack (5) with handcrank (3) until the drawbar (4) is seated in towing vehicle pintle and front leveling jack clears ground.

d. Remove locking pin (1) and fold up front leveling jack (5) to travel position. Insert locking pin to lock leveling jack. Store handcrank (3) in clip (6) on drawbar lunette (7).





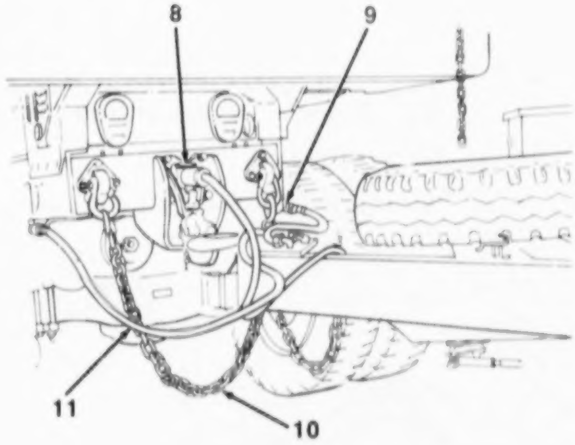
e. Attach safety chains (10) to towing vehicle.

NOTE

When connecting air lines to towing vehicle, ensure service to service and emergency to emergency connections are made.

f. Crisscross service air brake line (11) and emergency air brake line (9) and connect to towing vehicle.

g. Connect electrical power cable (8) to towing vehicle.

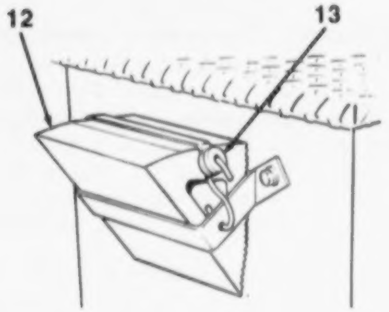


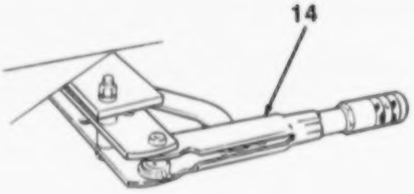
TA505409

2-15. COUPLING UNIT TO TOWING VEHICLE (Con't).

h. Remove chocks (12) from trailer wheels and store in retaining straps. Attach tie-down straps (13) to hold chocks in place.

i. Release parking brake (14).





WARNING

- **DO NOT tow compressor unit faster than 55 mph (88 kph) over paved highways, 10 mph (16 kph) over graded gravel roads or 8 mph (13 kph) over rough cross-country terrain or injury to personnel may result.**
- **DO NOT tow compressor unit on a side slope of more than 8°, or up or down a ramp having a slope of more than 20°. A slope of more than 8° can cause compressor unit to overturn, resulting in serious injury or death to personnel.**

j. Tow compressor unit to new location (see TM 9-2320-272-10).

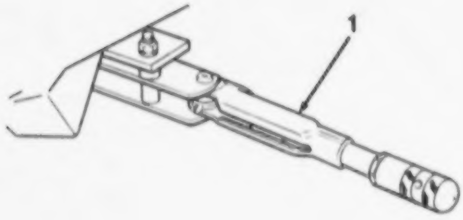
2-16. UNCOUPLING UNIT FROM TOWING VEHICLE.

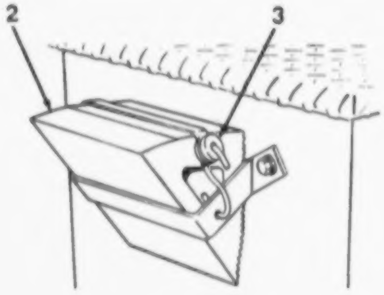
WARNING

To prevent sudden movement of compressor unit and possible injury to personnel, DO NOT disconnect compressor unit from towing vehicle on slopes greater than 7°.

a. Set parking brake (1).

b. Remove tie-down straps (3) and chocks (2) from retaining straps, and position chocks at wheels.





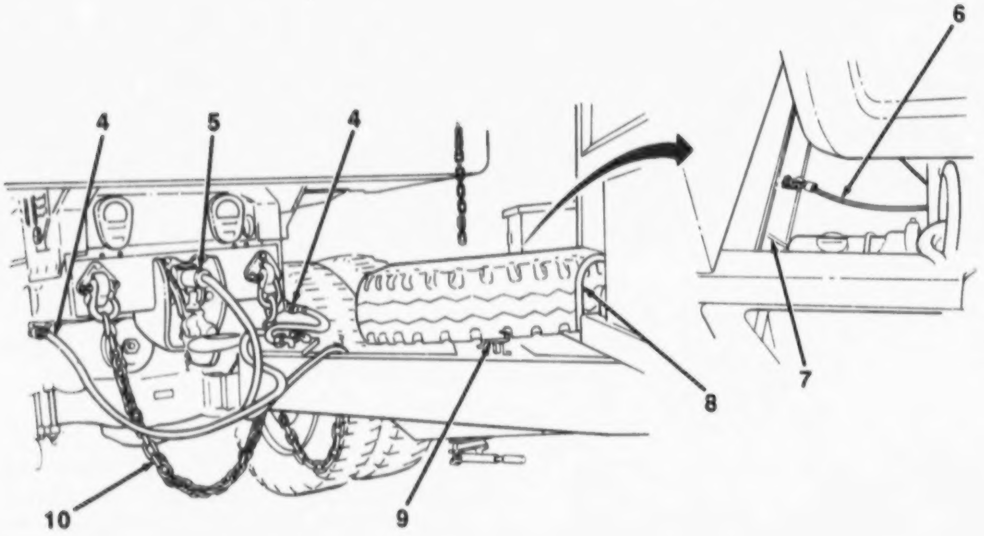
TA505410

2-16. UNCOUPLING UNIT FROM TOWING VEHICLE (Con't).

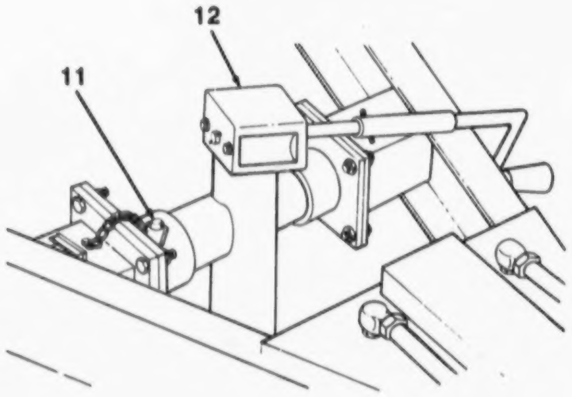
c. Disconnect electrical power cable (5) and place in holder (7).

d. Disconnect service and emergency brake air lines (4) from towing vehicle, and place in dummy couplers (9). Pull air tank drain cable (6) to discharge water from air tank.

e. Disconnect safety chains (10) from towing vehicle and hook to front crossmember hook (8).



f. Remove locking pin (11) and swing down front leveling jack (12). Insert locking pin and lock front leveling jack in down position.

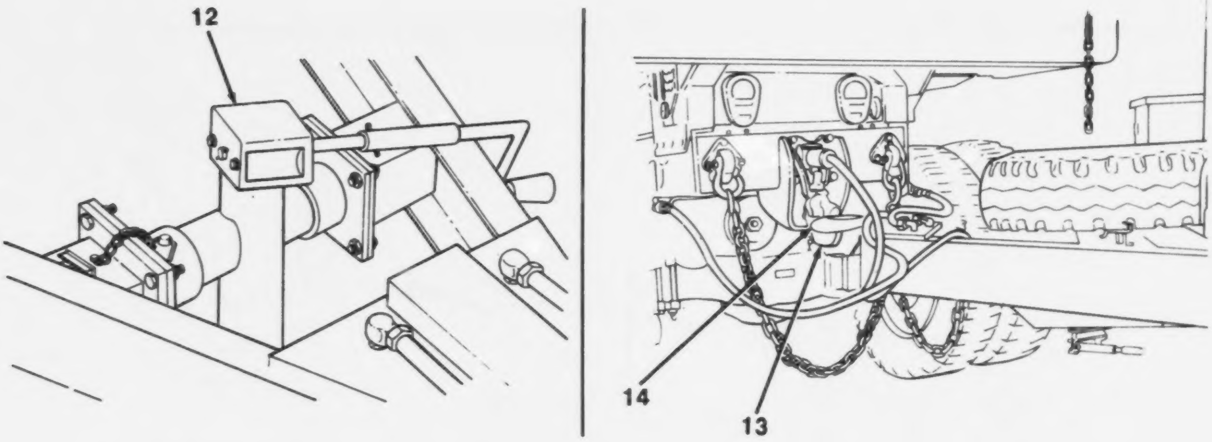


TA505411

2-16. UNCOUPLING UNIT FROM TOWING VEHICLE (Con't).

g. Using front leveling jack (12), raise drawbar (14) out of pintle (13).

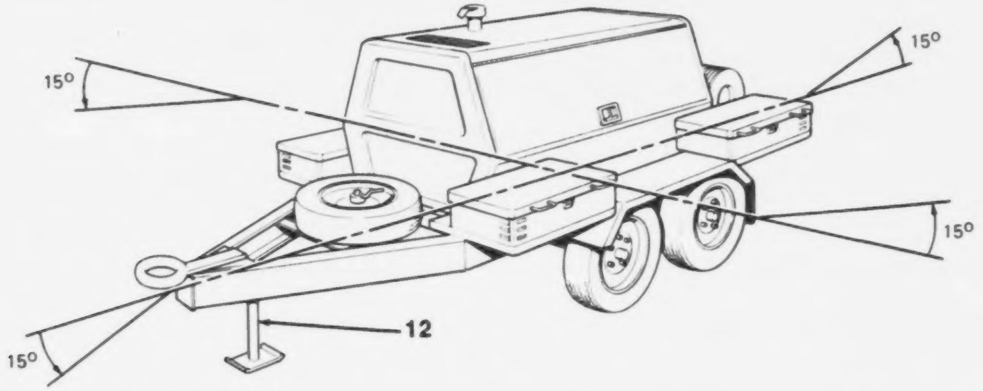
h. Move towing vehicle away from compressor unit (see TM 9-2320-272-10).



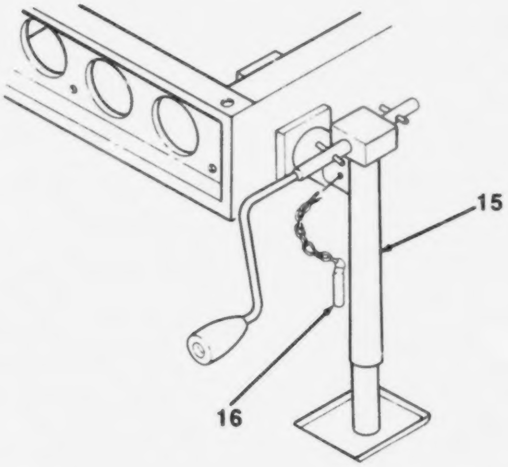
TA505412

2-16. UNCOUPLING UNIT FROM TOWING VEHICLE (Con't).

i. Using front leveling jack (12), raise or lower trailer until compressor unit is within 15° of level, end-to-end. If compressor unit is not within 15° of level, side-to-side, move compressor unit to a more suitable site (see paragraph 2-15).



j. Remove locking pins (16) and swing down rear leveling jacks (15). Insert locking pins to lock rear leveling jacks in position. Lower rear leveling jacks until firm contact is made with the ground.



TA505413

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

Paragraph Number	Title	Page Number
2-17	General	2-26
2-18	Operation in Dusty or Sandy Areas, or Extreme Dry Heat	2-26
2-19	Operation in Extreme Heat and High Humidity	2-26
2-20	Operation in Extreme Cold, Snow, or Mud	2-27
2-21	Operation in Salt Air and Sea Spray	2-30
2-22	Operation at High Altitudes	2-30
2-23	Fording	2-30
2-24	Emergency Operations	2-31

2-17. GENERAL.

This section contains instructions for safely operating the 250 CFM Trailer-Mounted Compressor Unit under unusual conditions. In addition to normal preventive maintenance, special care must be taken to keep the compressor unit operational in extreme temperatures and other environmental conditions.

2-18. OPERATION IN DUSTY OR SANDY AREAS, OR EXTREME DRY HEAT.

a. In dusty or sandy areas, you must guard against dust or sand getting into the unit.

b. Notify your supervisor to lubricate, change oil more often, and maintain proper oil levels (see LO 5-4310-452-12).

c. Frequently clean all filter caps and ensure that filter caps are secure.

d. Clean engine and compressor air filters as needed (see paragraph 3-4).

e. Frequently check compressor oil temperature gage.

f. Notify your supervisor to have the engine and compressor oil filters changed as needed (see LO 5-4310-452-12).

g. Notify your supervisor to have the engine crankcase oil drained and refilled when the ambient temperature goes above 80°F (27°C) (see LO 5-4310-452-12).

h. Keep the governor control cylinder rod clean.

i. Frequently check cooling fan belts for wear and proper tightness.

j. Keep the engine cooling fins and cooling fans clean and unobstructed (see paragraph 3-5).

2-19. OPERATION IN EXTREME HEAT AND HIGH HUMIDITY.

a. Check oil levels in engine and oil separator tank often (see LO 5-4310-452-12).

b. Drain fuel/water separator whenever water is visible in the sightbowl (see paragraph 3-6).

c. Frequently check cooling fan belts for wear and proper tightness.

d. Frequently check compressor oil temperature gage.

2-19. OPERATION IN EXTREME HEAT AND HIGH HUMIDITY (Con't).

e. Ensure that cooling fins and cooling fans are kept clean and unobstructed (see paragraph 3-5).

f. Occasionally drain service air manifold during the shift; drain more often if necessary.

2-20. OPERATION IN EXTREME COLD, SNOW, OR MUD.

a. **General.**

(1) Keep the unit clean and free of snow and mud accumulations.

(2) Do not allow snow or mud to get inside housing. If it does, clean thoroughly.

(3) Keep cooling fins and cooling fans clean and unobstructed (see paragraph 3-5).

(4) Notify your supervisor to have the engine oil drained and refilled when ambient temperature drops below 15°F (-9°C) (see LO 5-4310-452-12).

(5) In cold weather, use winter-grade fuel to prevent wax build up in the injector lines.

(6) At temperatures below -20°F (-29°C), the engine must be warmed up before starting operations.

(7) At temperatures below -4°F (-20°C), notify your supervisor to have the flywheel ring gear lubricated with low temperature grease (Item 5, Appendix E). This will ensure full engagement of the starter pinion.

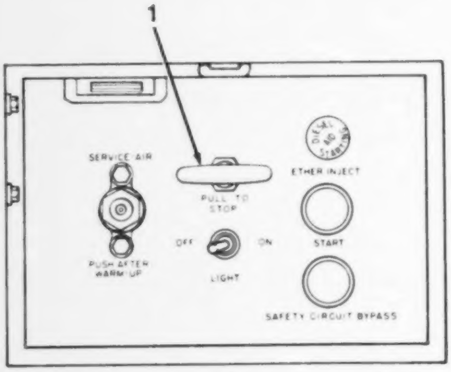
b. **Starting in Cold Weather, Below 32°F (0°C).**

CAUTION

Use extreme caution when using ether. It is an extremely volatile gas with a combustion temperature lower than that of vaporized diesel fuel. Too much ether can cause an uncontrolled explosion and may result in severe damage to engine.

(1) Disconnect any service air lines.

(2) Ensure that manual stop handle (1) is completely pushed in.



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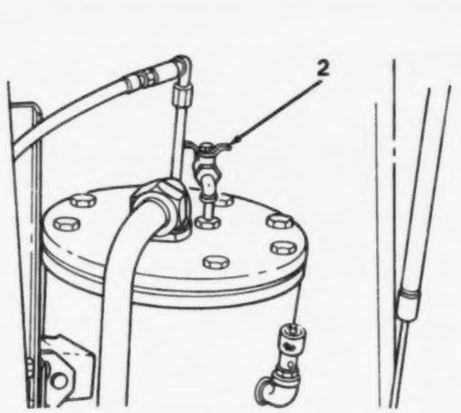
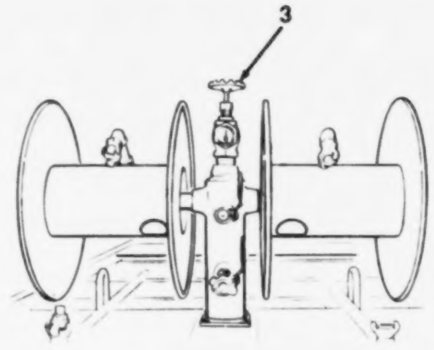
2-20. OPERATION IN EXTREME COLD, SNOW, OR MUD (Con't).

(3) Open manual blowdown valve (2) and service valve (3).



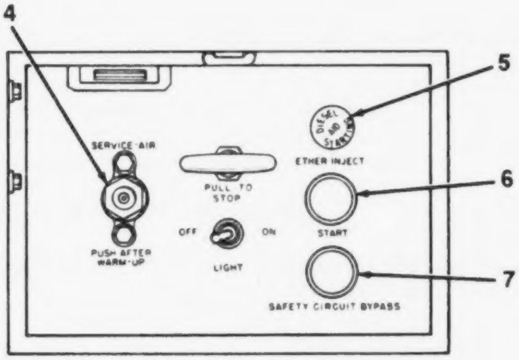


NOTE

When using ETHER INJECT knob, ensure that knob is pushed in immediately after pulling it out.

(4) Pull ETHER INJECT knob (5) once, and then completely push it back in. Simultaneously push SAFETY CIRCUIT BYPASS (7) and START (6) buttons. Release START button when engine starts. Release SAFETY CIRCUIT BYPASS button when engine oil pressure reaches 20 psi (138 kPa). Pull ETHER INJECT knob if engine falters, but do not use more than once every 15 seconds.

(5) Once compressor unit has started, gradually close manual blowdown valve (2) to keep engine running. Allow unit to warm up for 10 minutes.



NOTE

DO NOT open manual blowdown valve during operation, or engine shutdown may result from excessive compressor oil carryover.

(6) Push SERVICE-AIR button (4). Slowly close service valve (3) until unit is at idle. If safety relief valve opens, completely open service valve. Gradually close service valve until discharge pressure reaches and holds at 110 psi (758 kPa). Let unit run for five minutes. Service valve can now be completely closed and service lines attached.

TA505415

2-20. OPERATION IN EXTREME COLD, SNOW, OR MUD (Con't).

c. Jump Starting Engine with Slave Receptacle.

NOTE

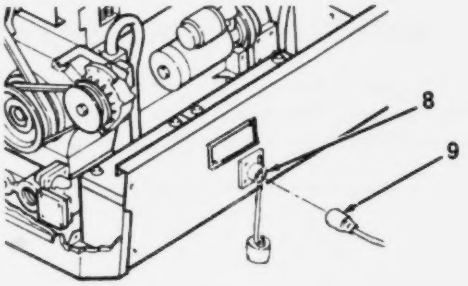
Be aware that in extremely cold weather, cranking power of storage batteries can be reduced by 50% or more. In extremely cold weather, it is advisable to remove storage batteries from unit and store them in a warm room until needed.

(1) Connect slave power cable (9) to slave connection of starting source.

(2) Connect slave power cable (9) to slave receptacle (8) of compressor unit.

(3) Start compressor unit engine (see paragraph 2-12).

(4) Disconnect slave power cable (9) from compressor unit and then from starting source.



d. Jump Starting Engine with Jumper Cables.

WARNING

Batteries generate hydrogen, a highly explosive gas. To prevent sparks from igniting battery gases, DO NOT connect the negative (-) jumper cable to the negative (-) terminal on the weak battery. If this warning is not followed, serious injury or death may result.

(1) Connect red, positive (+) cable to positive (+) terminal of starting source battery.

(2) Connect other end of positive (+) cable to a positive (+) terminal of compressor unit battery.

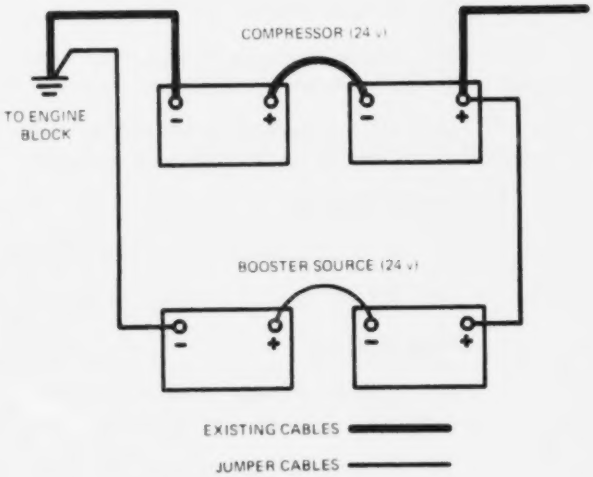
(3) Connect black, negative (-) cable to negative terminal of starting source battery.

(4) Connect other end of the negative (-) cable to engine block.

(5) Start compressor unit engine (see paragraph 2-12).

(6) Disconnect negative (-) cable from engine block and then from starting source battery.

(7) Disconnect positive (+) cable from compressor unit battery and then from starting source battery.



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2-21. OPERATION IN SALT AIR AND SEA SPRAY.

a. Operations in salt air and sea spray can be damaging to the unit because of saltwater's corrosive effects. Be particularly aware of the potential for rust.

b. Check twice daily for water in the oil of both the engine and the compressor.

c. Drain the fuel/water separator whenever water is visible in the sightbowl (see paragraph 3-6).

d. Keep the engine throttle control cylinder rod clean and free of rust.

2-22. OPERATION AT HIGH ALTITUDES.

a. Due to the thinner air at higher altitudes, the unit will operate at reduced capacity (i.e., the higher the altitude, the lower the capacity). This means the engine will produce less power and the compressor will have less air to compress; it will take longer to arrive at operating pressure; and it will be slower to replenish.

b. Since the engine and compressor of this unit are air-cooled, operating temperatures may increase.

CAUTION

DO NOT turn off the unit if it overheats. Turning it off will stop the flow of cooling air through the unit.

c. Frequently check the COMPRESSOR OIL TEMP gage. If the unit overheats, stop the use of all tools and allow the unit to run, unloaded, until it cools down to a more acceptable operating temperature, 185°F (85°C).

2-23. FORDING.

CAUTION

To prevent severe damage and contamination of internal components, DO NOT ford this unit in water with a depth greater than 30 in. (76 cm).

a. **Before Fording.**

(1) Ensure that all filler caps, plugs, and valves are closed and secure.

(2) Probe the area to be forded with a stick, and thoroughly check to ensure that there are no sudden dropoffs, boulders, or potholes which could overturn or damage the unit.

(3) Do not attempt to ford an area that has a swift current, high banks, or overhanging trees or boulders that appear to be in danger of toppling.

b. **During Fording.**

(1) At a safe operating speed, carefully move across the area to be forded.

(2) Do not stop or attempt to back up.

c. **After Fording.**

(1) Check oil levels of engine and compressor, and test for water. If oil levels are too high, water has entered and the oil must be replaced (see LO 5-4310-452-12).

(2) Open housing and wipe off water from the engine and compressor components.

(3) Wipe dry and/or allow time to dry, all electrical components and wires.

(4) When you move on, lightly apply the brakes to aid in drying. If brakes malfunction after fording and drying, notify your supervisor.

2-24. EMERGENCY OPERATIONS.

a. In an emergency, the unit can be operated with damaged running gear.

b. If the compressor, engine, or related assemblies are damaged, the unit CANNOT be operated.

CHAPTER 3
OPERATOR MAINTENANCE

Section I. LUBRICATION INSTRUCTIONS

3-1. OPERATOR LUBRICATION INSTRUCTIONS.

For specific lubrication points on the 250 CFM Trailer-Mounted Compressor Unit, refer to LO 5-4310-452-12.

Section II. OPERATOR TROUBLESHOOTING

Paragraph Number	Title	Page Number
3-2	General	3-1
3-3	Troubleshooting Symptom Index	3-2
Table 3-1	Operator Troubleshooting Procedures	3-2

3-2. GENERAL.

a. This section provides information for identifying and correcting malfunctions which may develop while operating the compressor unit.

b. The Troubleshooting Symptom Index in paragraph 3-3 lists the common malfunctions which may occur, and will refer you to the proper page in Table 3-1 for a troubleshooting procedure.

c. Refer to Chapter 1, Section III for a better understanding of how a particular system operates. If you are unsure of the location of an item mentioned in troubleshooting, refer to paragraph 1-9 or to the maintenance task where the item is replaced.

d. This manual cannot list all malfunctions that may occur, nor all the tests or inspections and corrective actions. If a malfunction is not listed, or is not corrected by a listed corrective action, notify your supervisor.

e. When troubleshooting a malfunction:

(1) Locate the symptom or symptoms in paragraph 3-3 that best describe the malfunction.

(2) Turn to the page in Table 3-1 where the troubleshooting procedures for the malfunction in question are described. Headings at the top of each page show how each troubleshooting procedure is organized: MALFUNCTION, TEST OR INSPECTION (in step number order), and CORRECTIVE ACTION.

(3) Perform each step in the order listed until the malfunction is corrected. DO NOT perform any maintenance task unless the troubleshooting procedure tells you to do so.

3-3. TROUBLESHOOTING SYMPTOM INDEX.

	Troubleshooting Procedure Page
COMPRESSOR	
Air discharge capacity too low	3-4
Oil:	
Consumption too high	3-5
Excessive carry-over at air discharge	3-4
Level reading erratic	3-5
Overheats	3-4
ENGINE	
Difficult to start	3-3
Oil pressure too low	3-3
Overheats	3-3
Runs backward when turned off	3-4
Unusual amount of smoke from exhaust	3-3
Will not start	3-2

Table 3-1. Operator Troubleshooting Procedures.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

ENGINE

1. ENGINE WILL NOT START.

Step 1. Check to see if fuel tank is empty.

If empty, notify your supervisor.

Step 2. Check for loose or corroded battery terminals.

If loose or corroded, notify your supervisor.

Step 3. Check engine air cleaner restriction indicator.

If red condition is present, clean air cleaner (see paragraph 3-4).

Step 4. Check fuel lines for leaks, kinks, or restrictions.

If leaks, kinks, or restrictions are found, notify your supervisor.

Table 3-1. Operator Troubleshooting Procedures (Con't).

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

2. ENGINE IS DIFFICULT TO START.

Step 1. Check for loose, dirty, or corroded battery terminals.

If battery terminals are loose, dirty, or corroded, notify your supervisor.

Step 2. Check engine air cleaner restriction indicator.

If red condition is present, clean air cleaner (see paragraph 3-4).

Step 3. Check that engine oil is proper grade (cold weather).

If engine oil is not proper grade, notify your supervisor.

3. UNUSUAL AMOUNT OF SMOKE FROM EXHAUST.

Check color of exhaust smoke.

If smoke is blue, notify your supervisor.

If smoke is black, check air cleaner restriction indicator. If red condition is present, clean air cleaner (see paragraph 3-4).

4. ENGINE OVERHEATS.

Step 1. Check engine oil level.

If oil level is low, notify your supervisor.

Step 2. Check for dirty cooling fins on engine cylinder heads.

Clean engine cooling fins (see paragraph 3-5).

Step 3. Check for blocked or dirty cooling fan.

Clean cooling fan (see paragraph 3-5).

Step 4. Check left and right door assemblies.

Ensure that door assemblies are closed.

5. ENGINE OIL PRESSURE TOO LOW.

Step 1. Check lubrication oil system for leaks, kinks, or restrictions.

If leaks, kinks, or restrictions are found, notify your supervisor.

Step 2. Check engine oil level.

If oil level is low, notify your supervisor.

Table 3-1. Operator Troubleshooting Procedures (Con't).

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Step 3. Ensure that compressor unit is level.

Adjust compressor unit to within 15° of level end-to-end (see paragraph 2-12).

6. ENGINE RUNS BACKWARD WHEN TURNED OFF.

Check engine idle speed on TACH/HOURMETER gage.

If engine idle speed is greater than 1400 rpm, notify your supervisor.

COMPRESSOR

7. EXCESSIVE OIL CARRY-OVER AT AIR DISCHARGE.

Check oil level in oil separator sight tube.

If oil is above maximum level (see LO 5-4310-452-12), notify your supervisor.

8. COMPRESSOR OVERHEATS.

Step 1. Check for dirty or clogged compressor oil cooler.

Clean compressor oil cooler (see paragraph 3-7).

Step 2. Check for loose, slipping, or broken fan belt.

If fan belt is loose, slipping, or broken, notify your supervisor.

Step 3. Check compressor oil level.

If oil level is low, notify your supervisor.

Step 4. Check to see if compressor oil is proper grade.

If oil is not proper grade, notify your supervisor.

Step 5. Check to see if cooling air is recirculating.

Relocate unit so wind does not recirculate cooling air.

9. AIR DISCHARGE CAPACITY TOO LOW.

Step 1. Check for dirty compressor air cleaner.

Clean compressor air cleaner (see paragraph 3-4).

Step 2. Check to see if compressor maintains proper air line pressure of 100 psi (690 kPa) on discharge gage.

If compressor does not maintain proper air line pressure, notify your supervisor.

Table 3-1. Operator Troubleshooting Procedures (Con't).

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

---

10. OIL CONSUMPTION TOO HIGH.

Check to see if compressor unit is level.

Adjust compressor unit to within 15° of level end-to-end (see paragraph 2-12).

11. OIL LEVEL READING ERRATIC.

Check to see if compressor unit is level.

Adjust compressor unit to within 15° of level end-to-end (see paragraph 2-12).

Section III. OPERATOR MAINTENANCE PROCEDURES

Paragraph Number	Title	Page Number
3-4	Air Cleaner Cleaning	3-6
3-5	Engine Cooling Fan, Cooling Fins, and Oil Cooler Cleaning	3-7
3-6	Fuel/Water Separator Servicing	3-9
3-7	Compressor Oil Cooler Cleaning	3-9
3-8	Parking Brake Adjustment	3-10

3-4. AIR CLEANER CLEANING.

NOTE

Engine and compressor air cleaners are cleaned the same.

a. Removal.

(1) Open left and right door assemblies (1).

(2) Remove wingnut (2) and cover (7) from air cleaner body (3).

(3) Remove wingnut (6) and filter element (5) from air cleaner body (3).

b. Cleaning.

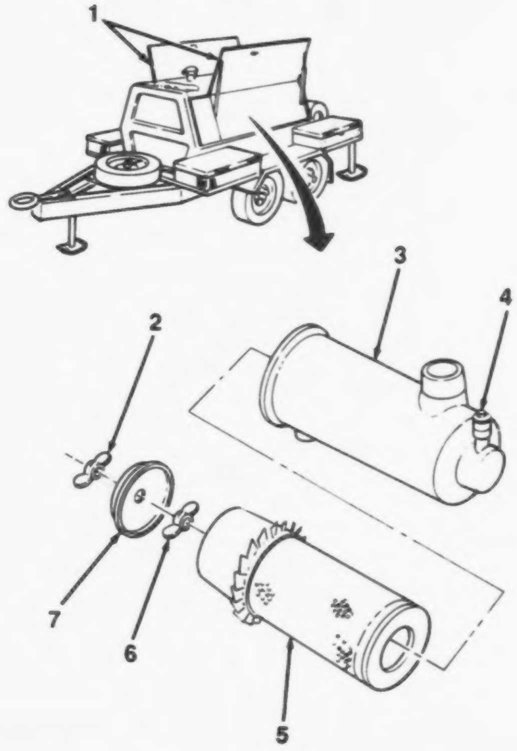
WARNING

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.

(1) Direct compressed air through filter element (5) in opposite direction of normal air flow. Using air gun, move up and down while directing compressed air through filter element.

(2) Using a light inside filter element (5), visually inspect for tears or holes. If filter element has tears or holes, or is contaminated with dry or greasy dirt or oil, it must be replaced. Notify your supervisor.

(3) Clean air cleaner body (3) with rag (Item 11, Appendix E). Inspect air cleaner body for cracks, breaks, or dents. If damaged, notify your supervisor.



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3-4. AIR CLEANER CLEANING (Con't).

c. **Installation.**

(1) Place filter element (5) in air cleaner body (3) and install wingnut (6).

(2) Install cover (7) on air cleaner body (3). Install wingnut (2) fingertight.

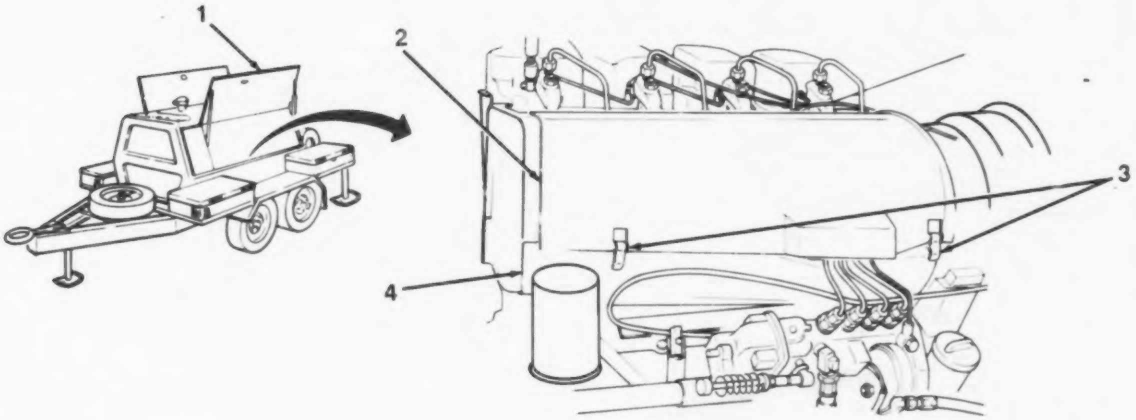
(3) Press down on top of restriction indicator (4) and reset to green condition.

(4) Close left and right door assemblies (1).

3-5. ENGINE COOLING FAN, COOLING FINS, AND OIL COOLER CLEANING.

a. Open left door assembly (1).

b. Open 2 fasteners (3) and remove duct (2) from base cowling (4).



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3-5. ENGINE COOLING FAN, COOLING FINS, AND OIL COOLER CLEANING (Con't).

WARNING

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.

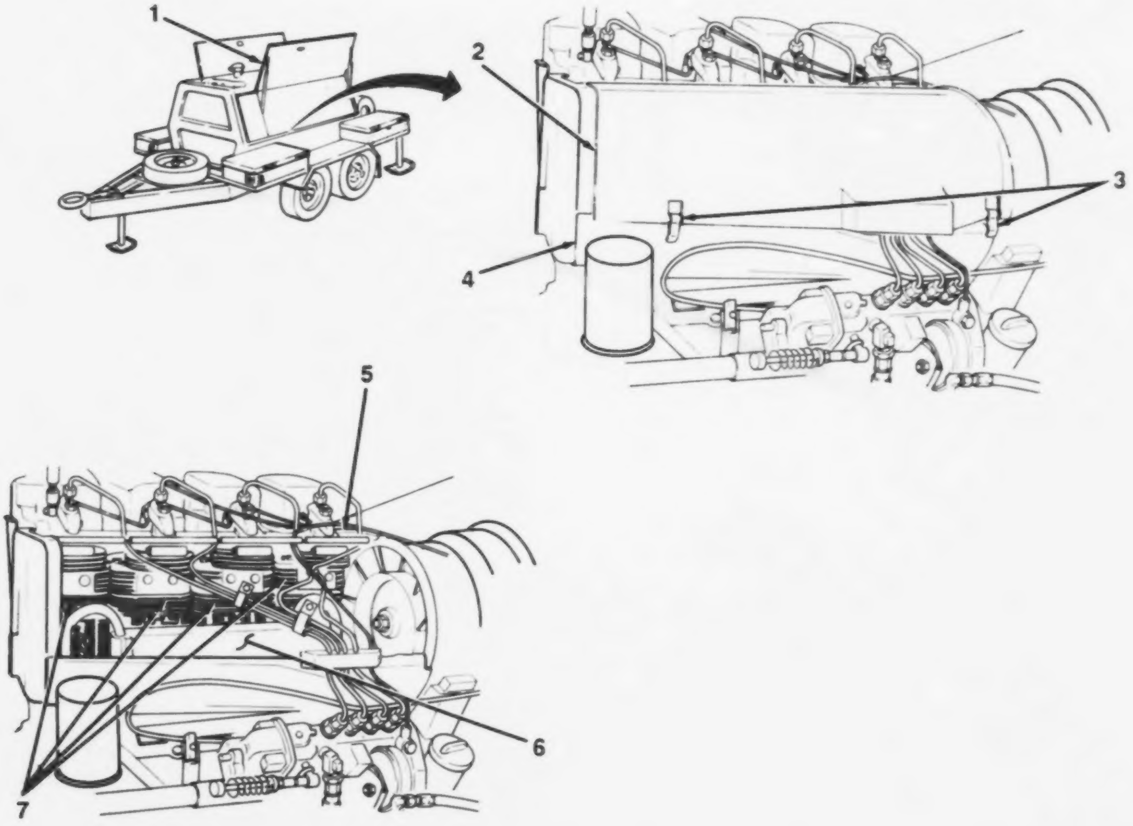
CAUTION

When using a wire brush during cleaning, ensure that cooling fins and oil cooler are not damaged.

c. Using compressed air and wire brush, clear dust and dirt from vanes of cooling fan (5), cooling fins (7), and oil cooler (6).

d. Install duct (2) on base cowling (4). Close 2 fasteners (3).

e. Close left door assembly (1).



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3-6. FUEL/WATER SEPARATOR SERVICING.

NOTE

Drain fuel/water separator only when water is visible in sightbowl.

a. Open left door assembly (1).

b. Place suitable container under trailer at bottom end of hose (6).

c. Loosen drain assembly knob (5) and drain water from fuel/water separator (3) until only clear fuel is draining.

d. Tighten drain assembly knob (5) and unscrew hand primer pump knob (2).

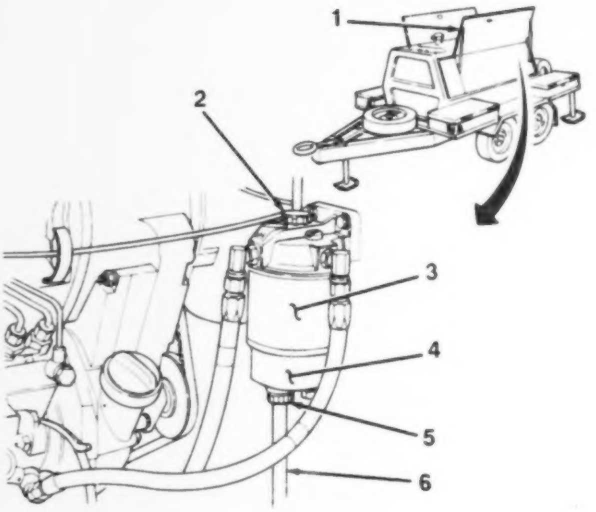
e. Using hand primer pump knob (2), pump until pressure is felt and sightbowl (4) is full of fuel.

f. Tighten primer pump knob (2).

g. Start engine and check for leaks (see paragraph 2-12).

h. Shut engine off (see paragraph 2-13).

i. Close left door assembly (1).



3-7. COMPRESSOR OIL COOLER CLEANING.

a. Open right access door (2).

b. Open left and right door assemblies (1).

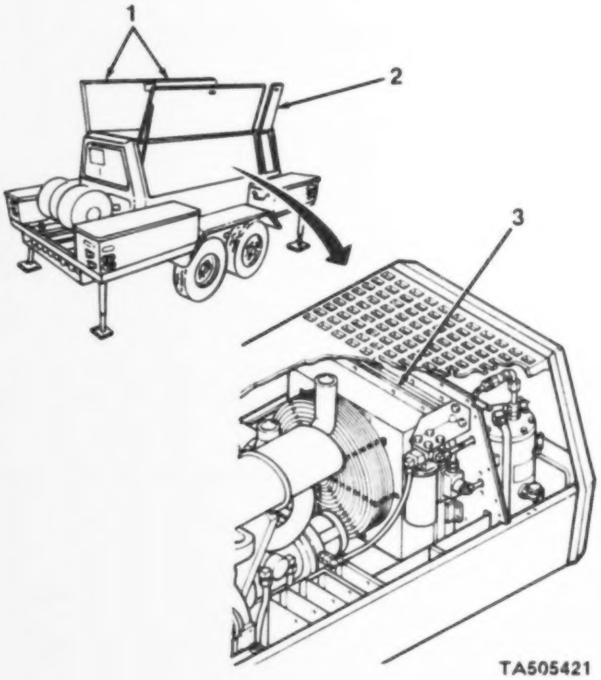
WARNING

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.

c. Using compressed air, clear dust and dirt from oil cooler (3).

d. Close left and right door assemblies (1).

e. Close right access door (2).



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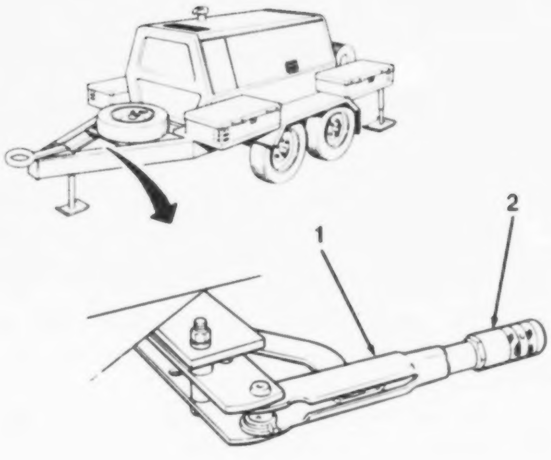
3-8. PARKING BRAKE ADJUSTMENT.

a. Place parking brake handle (1) in released position.

b. Turn parking brake handle knob (2) clockwise to tighten, or counterclockwise to loosen parking brake.

c. Place parking brake handle (1) in engaged position, then in released position to test.



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CHAPTER 4
ORGANIZATIONAL MAINTENANCE

Section I. SERVICE UPON RECEIPT

Paragraph Number	Title	Page Number
4-1	Preparation for Use	4-1
4-2	Lubrication	4-2
4-3	Servicing Instructions	4-2

4-1. PREPARATION FOR USE.

a. Unloading With Towing Vehicle.

WARNING

To prevent sudden movement of the trailer and possible injury to personnel, ensure that parking brake is set.

(1) Set the parking brake.

(2) Place chocks under the wheels and remove the tie-downs securing unit to the carrier.

WARNING

To prevent injury, ensure that drive-off ramp is properly positioned and secured.

(3) Place drive-off ramp on carrier.

(4) Back towing vehicle up drive-off ramp and onto carrier. Connect trailer to towing vehicle (see paragraph 2-15).

(5) Drive towing vehicle and trailer off carrier.

b. Unloading With a Crane.

WARNING

- **Compressor weighs 7,000 pounds. To prevent injury when unloading compressor with a crane, ensure that lifting device used is rated for a minimum lifting capacity of five tons.**
- **To prevent sudden movement of trailer and possible injury to personnel, ensure that the parking brake is set.**

(1) Set the parking brake.

(2) Move lifting device into position over the unit.

(3) Secure the lifting straps to the trailer lifting eyes and take up slack in the straps. Refer to lifting and tie-down data plate on the side of the unit.

4-1. PREPARATION FOR USE (Con't).

(4) Raise unit off carrier with lifting device and set unit down on flat, level surface.

c. Inspection of the Unit.

(1) Check carefully for and report any and all damage.

(2) Refer to the bill of lading and ensure that the unit has everything listed.

(3) Check tires for proper inflation (see Table 2-1).

4-2. LUBRICATION.

CAUTION

The unit is shipped from the manufacturer fully lubricated and with the engine and compressor sumps filled to the proper levels with the correct grades of oils. If a lubrication point was overlooked by the manufacturer, now is the time to find it, not when the unit is being operationally tested.

Check all points of lubrication (see LO 5-4310-452-12).

4-3. SERVICING INSTRUCTIONS.

a. Start the unit and let run for a period no less than 20 minutes and no more than 45 minutes (see paragraph 2-12).

b. Perform "During Operation" checks (see paragraph 2-14), and observe the following:

(1) All controls and indicators are in normal range.

(2) There are no air or oil leaks present.

(3) The unit shows no unusual tendencies, for example: engine stalling repeatedly, excessive vibration, or other signs of improper operation.

Section II. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Paragraph Number	Title	Page Number
4-4	General	4-3
4-5	Intervals	4-3
4-6	Reporting Repairs	4-3
4-7	General PMCS Procedures	4-3
4-8	Specific PMCS Procedures	4-4
Table 4-1	Organizational Preventive Maintenance Checks and Services (PMCS)	4-5

4-4. GENERAL.

The 250 CFM Trailer-Mounted Compressor Unit must be inspected on a regular basis so that defects are found before they result in serious damage, failure, or injury to personnel. This section, Preventive Maintenance Checks and Services (PMCS), contains systematic instructions on inspections, adjustments, and corrections to be performed by organizational maintenance.

4-5. INTERVALS.

Organizational maintenance shall perform PMCS, found in Table 4-1, at the following intervals:

(1) Quarterly (Q), once every three months.

(2) Semiannually (S), once every six months.

(3) Hours (H), after the prescribed number of hours of operation.

4-6. REPORTING REPAIRS.

All defects shall be reported on DA Form 2404, *Equipment Inspection and Maintenance Worksheet*, immediately after completing PMCS and before taking corrective action. These defects shall also be reported in the equipment log.

4-7. GENERAL PMCS PROCEDURES.

a. While performing specific PMCS procedures, ensure that items are correctly assembled, secure, servicable, adequately lubricated, and not worn or leaking as defined below:

(1) An item is CORRECTLY ASSEMBLED when it is in proper position and all parts are present.

(2) Wires, nuts, hoses, fittings, or attaching hardware are SECURE when they cannot be easily removed by hand or by wrench.

(3) An item is SERVICABLE if it is not worn beyond repair or likely to fail before the next scheduled inspection.

(4) An item is ADEQUATELY LUBRICATED if it has been lubricated in accordance with Chapter 3, Section I.

(5) An item is WORN if there is too much play between joining parts, if item does not meet wear specifications provided, or when warning, caution, and data stencil markings, plates, or decals are not legible.

4-7. GENERAL PMCS PROCEDURES (Con't).

(6) For a classification of LEAKAGE, see paragraph 2-9.

b. Perform inspections of welds, electrical conduits, tubing, and hoses as described below:

(1) Check for loose or chipped paint, rust, or gaps where parts are welded together. If a bad weld is found, notify your supervisor.

(2) Look for cracked, frayed, loose, or broken electrical conduits, tubing, and hoses. Tighten all loose components. Repair or report unservicable items.

(3) Check for wear, damage, and leaks, and ensure that couplings and fittings are tight. Wet spots indicate leaks, but a stain around a coupling or fitting can also mean a leak. If a leak comes from a loose coupling or fitting, tighten it. Repair or report unserviceable items.

c. Where the instruction "tighten" appears in a procedure, tighten the item to the given value even if the item appears secure. If no torque value is given, refer to Appendix F.

d. Where the instruction "clean" appears in a procedure, use guidelines found in paragraph 2-8. Even if a procedure does not specify cleaning, be aware of any buildup of dirt, grease, oil, and debris. Clean any such buildups using cleaning agents authorized in Appendix E. Lubricate as required (see Chapter 3, Section I).

4-8. SPECIFIC PMCS PROCEDURES.

a. Organizational PMCS are provided in Table 4-1. Always perform PMCS in the order listed. Once it becomes a habit, anything that is not right can be spotted in a minute. If anything wrong is discovered through PMCS, perform the appropriate troubleshooting task in Section IV of this chapter. If any component or system is not serviceable, or if the given service does not correct the problem, notify your supervisor.

b. The PMCS procedures in Table 4-1 are performed at three intervals: Quarterly, Semiannually, and Hours. Before performing preventive maintenance, read all checks required for the applicable interval and prepare tools needed to make inspections in the order listed within the designated interval.

c. The columns in PMCS table are defined as follows:

(1) **Item No.** Provides a logical sequence for PMCS to be performed and is used as a source number when filling out DA Form 2404.

(2) **Interval.** Specifies interval at which PMCS is to be performed.

(3) **Item To Be Inspected.** Lists system and common names of items that are to be inspected.

(4) **Procedures.** Lists the specific servicing, inspection, replacement, or adjustment procedures to be followed.

Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS).

Q - Quarterly S - Semiannual H - Hours

ITEM NO.	INTERVAL			ITEM TO BE INSPECTED	PROCEDURES
	Q	S	H		
					WARNING **The compressor lubricating/cooling system is under pressure. To prevent injury, do not, under any circumstance, remove drain plug or filler plug from the compressor lubricating/cooling system while under pressure. Open the manual blowdown valve as a safety precaution first.** **NOTE** **Perform all Operator PMCS first.**
1				WARRANTY REQUIREMENTS (One Time Service)	
			50		a. After first 50 hours of operation, change engine and compressor oil filters.
			50		b. Check valve clearance (see paragraph 4-13).
			150		c. After first 150 hours of operation, change engine oil, oil filter and compressor oil filter. After warranty requirements have been met, the engine oil and filter are changed in accordance with the Army Oil Analysis Program (AOAP) (see LO 5-4310-452-12).
2				COOLING FINS	
			250		Clean and inspect the engine cooling fins (see paragraph 3-5).
3				DRIVE BELTS	
			250		a. Visually check belts for cracks or deterioration. If belts are cracked or deteriorated, replace belts (see paragraph 4-33, 4-37, or 4-91).
			250		b. Check alternator belt for deflection by pressing down on belt and measuring deflection. If belt deflects more than 0.4–0.6 in. (10–15 mm) adjust belt (see paragraph 4-37).
			250		c. Check belt break switch (see paragraph 4-42) and all warning devices for function (see paragraph 4-55).

Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS) (Con't).

Q - Quarterly S - Semiannual H - Hours

ITEM NO.	INTERVAL			ITEM TO BE INSPECTED	PROCEDURES
	Q	S	H		
4				COMPRESSOR	**WARNING** **The compressor lubricating/cooling system is under pressure. To prevent injury, do not, under any circumstance, remove drain plug or filler plug from the compressor lubricating/cooling system while under pressure. Open the manual blowdown valve as a safety precaution first.**
			250		a. Inspect all lines, hoses, and fittings for leaks or damaged parts. Drain compressor oil, replace oil filter, and service oil (see paragraph 4-84 and LO 5-4310-452-12).
			250		b. Clean cooling fan (see paragraph 4-92).
5				FUEL SYSTEM	
			250		a. Replace fuel filter (see paragraph 4-26).
			250		b. Clean fuel strainer in metering fuel pump (see paragraph 4-22).
			250		c. Replace filter element in fuel/water separator (see paragraph 4-27).
			250		d. Inspect all fuel lines and hoses for damage or leaks.
6				VALVE CLEARANCE	
			500		Adjust valve clearance (see paragraph 4-13).
7				OIL SEPARATOR	
			500		Replace element in oil separator (see paragraph 4-87).
8				BRAKES	
			4000		Adjust brakes (see paragraph 4-65).
9				WHEEL BEARINGS	
			4000		Clean and repack wheel bearings (see LO 5-4310-452-12).

Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS) (Con't).

Q - Quarterly S - Semiannual H - Hours

ITEM NO.	INTERVAL			ITEM TO BE INSPECTED	PROCEDURES
	Q	S	H		
10				AIR SILENCER	
	●				Remove, clean, and inspect air silencer (see paragrapn 4-94).
11				DRAWBAR	
		●			Check drawbar mounting bolts for proper torque of 180-200 lb.-ft (244-271 N•m).

Section III. ORGANIZATIONAL TROUBLESHOOTING

Paragraph Number	Title	Page Number
4-9	General	4-9
4-10	Troubleshooting Symptom Index	4-10
Table 4-2	Mechanical Troubleshooting Procedures	4-10
Table 4-3	Electrical Troubleshooting Procedures	4-15

4-9. GENERAL.

a. This section contains information for identifying and correcting most electrical and mechanical malfunctions which may occur on the 250 CFM Trailer-Mounted Compressor Unit. Electrical malfunctions are isolated to an individual circuit or component. Component replacement is referenced to another section, unless only basic knowledge is required to perform the task.

b. The Troubleshooting Symptom Index in paragraph 4-10 lists the common malfunctions which may occur. The symptom index refers you to the proper page in Tables 4-2 and 4-3 for a troubleshooting procedure.

c. Refer to Chapter 1, Section II for a better understanding of how a system operates. If you are unsure of the location of an item mentioned in troubleshooting, see paragraph 1-9 or the maintenance task where the item is replaced.

d. This manual cannot list all the electrical and mechanical malfunctions that may occur, nor all the tests or inspections and corrective actions, but the most likely to occur are mentioned. In general, a switch or sending unit is more likely to be defective than a gage or indicator. The least likely cause of an electrical malfunction would be in the wires or harnesses. If a malfunction is not listed, or is not corrected by a listed corrective action, notify your supervisor.

e. Check the condition of the storage batteries prior to making any electrical checks (see TM 9-6140-200-14).

f. When troubleshooting a malfunction:

(1) Question the operator to obtain any information that might help determine the cause of the problem. Before continuing, ensure that all applicable operator troubleshooting has been performed.

(2) Locate symptom or symptoms in paragraph 4-10 that best describe the malfunction. If the appropriate symptom is not listed, notify your supervisor.

(3) Turn to the page in Table 4-2 or 4-3 where the troubleshooting procedures for the malfunction in question are described. Headings at the top of each page show how each troubleshooting procedure is organized: MALFUNCTION, TEST OR INSPECTION (in step number order), and CORRECTIVE ACTION.

(4) Perform each step in the order listed until the malfunction is corrected. DO NOT perform any maintenance task unless the troubleshooting procedure tells you to do so.

4-10. TROUBLESHOOTING SYMPTOM INDEX.

MECHANICAL TROUBLESHOOTING

COMPRESSOR

	Troubleshooting Procedure Page
Air discharge pressure too low	4-13
Blowdown valve operates erratically	4-12
Compressor air unsuitable for sandblasting (excessive oil in air outlet)	4-13
Excessive oil carryover	4-12
Excessive vibration	4-14
Oil:	
Blows back into compressor air cleaner	4-13
Consumption too high	4-13
Safety relief valve relieves	4-14
Start pressure too high	4-14
Unit will not unload	4-14

ENGINE

	Troubleshooting Procedure Page
Difficult to start/performs poorly	4-11
Exhaust smokes excessively	4-11
Surges when running	4-12
Turns off prematurely	4-11
Vibrates excessively	4-11
Will not:	
Run at correct speed	4-12
Start	4-11

ELECTRICAL TROUBLESHOOTING

	Troubleshooting Procedure Page
Ammeter:	
Indicates constant "charge" condition with engine idling	4-17
Indicates no/low "charge" condition with engine idling	4-16
Engine:	
Cranks, but will not start	4-16
Cranks slowly	4-15
Will not crank	4-15

Table 4-2. Mechanical Troubleshooting Procedures.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE

1. **WILL NOT START.**

Check to see if fuel filter is clogged.

Replace fuel filter element (see paragraph 4-26).

2. **DIFFICULT TO START/PERFORMS POORLY.**

Step 1. Check to see if fuel is forming wax (winter operation).

Replace with winter-grade fuel (see paragraph 2-20).

Step 2. Check for erratic or insufficient fuel supply.

Bleed fuel system (see paragraph 4-21).

Step 3. Check for proper valve clearance.

Adjust valve clearance (see paragraph 4-13).

3. **EXHAUST SMOKES EXCESSIVELY.**

Check for proper valve clearance.

Adjust valve clearance (see paragraph 4-13).

4. **TURNS OFF PREMATURELY.**

Step 1. Check to see if engine idle speed is too low.

Adjust throttle control (see paragraph 4-25).

Step 2. Check for any broken or loose electrical connections.

Test and tighten loose electrical connections.

Step 3. Check for faulty compressor oil temperature or engine oil pressure shutdown switch.

Locate faulty switch and replace.

5. **VIBRATES EXCESSIVELY.**

Step 1. Check to see if engine idle speed is too low.

Adjust throttle control (see paragraph 4-25).

Step 2. Check for proper valve clearance.

Adjust valve clearance (see paragraph 4-13).

Table 4-2. Mechanical Troubleshooting Procedures (Con't).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

6. SURGES WHEN RUNNING.

Step 1. Check to see if regulating valve is restricted.

Replace regulating valve (see paragraph 4-94).

Step 2. Check for tension on engine speed control inner spring.

Adjust throttle control (see paragraph 4-25).

Step 3. Check to see if engine speed control springs are broken.

Replace throttle control (see paragraph 4-25).

7. WILL NOT RUN AT CORRECT SPEED.

Step 1. Check to see if fuel filter is clogged.

Clean or change fuel filter element (see paragraph 4-26).

Step 2. Check to see if engine air cleaner filter is clogged.

Clean or change engine air cleaner filter (see paragraph 4-16).

Step 3. Check to see if pressure regulator is set too low.

Adjust throttle control (see paragraph 4-25).

COMPRESSOR

1. BLOWDOWN VALVE OPERATES ERRATICALLY.

Step 1. Check for defective blowdown valve diaphragm.

Replace blowdown valve (see paragraph 4-95).

Step 2. Check for dirty blowdown valve.

Inspect and clean blowdown valve.

2. EXCESSIVE OIL CARRYOVER.

Step 1. Check for clogged oil scavenger line.

Remove and clean oil scavenger line (see paragraph 4-86).

Step 2. Check for oil carryover into discharge line.

Replace oil separator filter element (see paragraph 4-87).

Table 4-2. Mechanical Troubleshooting Procedures (Con't).

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Step 3. Check for defective minimum pressure and service valve.

Repair or replace minimum pressure and service valve (see paragraph 4-100).

Step 4. Check to see if unit was shut down improperly.

Instruct operator on correct shutdown procedure.

3. AIR DISCHARGE PRESSURE TOO LOW.

Step 1. Check to see if engine speed is too low.

Adjust throttle control (see paragraph 4-25).

Step 2. Check to see if air silencer is restricted or mesh is damaged or missing.

Clean or replace air silencer as necessary (see paragraph 4-94).

Step 3. Check blowdown valve for leaks.

Tighten or replace blowdown valve (see paragraph 4-95).

Step 4. Check regulating valve for leaks.

Tighten or replace regulating valve (see paragraph 4-94).

4. COMPRESSOR AIR UNSUITABLE FOR SANDBLASTING (EXCESSIVE OIL IN AIR OUTLET).

Step 1. Check for excessive oil in air lines.

Replace oil separator filter element (see paragraph 4-87).

Step 2. Check for clogged oil scavenger line.

Remove and clean oil scavenger line (see paragraph 4-86).

Step 3. Check for defective minimum pressure and service valve.

Repair minimum pressure and service valve (see paragraph 4-100).

5. OIL CONSUMPTION TOO HIGH.

Check for excessive oil carryover.

Refer to Malfunction 2, EXCESSIVE OIL CARRYOVER.

6. OIL BLOWS BACK INTO COMPRESSOR AIR CLEANER.

Check for damaged or defective unloader valve assembly.

Replace unloader valve assembly (see paragraph 4-90).

Table 4-2. Mechanical Troubleshooting Procedures (Con't).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

7. UNIT WILL NOT UNLOAD.

Step 1. Check for blocked regulating valve inlet.

Remove and clean regulating valve (see paragraph 4-94).

Step 2. Check regulating valve adjustment.

Adjust throttle control (see paragraph 4-25).

Step 3. Check for defective blowdown valve.

Replace blowdown valve (see paragraph 4-95).

8. SAFETY RELIEF VALVE RELIEVES.

Step 1. Check to see if safety valve pops off.

Replace oil separator filter element (see paragraph 4-87).

Step 2. Check to see if operating pressure is too high.

Adjust throttle control (see paragraph 4-25).

Replace unloader valve assembly (see paragraph 4-90).

Remove and clean regulating valve (see paragraph 4-94).

Replace safety relief valve (see paragraph 4-96).

9. START PRESSURE TOO HIGH.

Step 1. Check for blocked regulating valve inlet.

Remove and clean regulating valve (see paragraph 4-94).

Step 2. Check for defective blowdown valve.

Replace blowdown valve (see paragraph 4-95).

10. EXCESSIVE VIBRATION.

Step 1. Check for loose fan hub.

Tighten fan hub (see paragraph 4-92).

Step 2. Check for bent or broken fan blades.

Replace fan (see paragraph 4-92).

Table 4-3. Electrical Troubleshooting Procedures.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE WILL NOT CRANK.

NOTE

- **Ensure that batteries are fully charged.**
- **Ensure that cables are good and correctly installed.**
- **Ensure that connectors are clean and secure on terminals.**

Step 1. Check starter circuit fuse.

If bad, replace fuse (see paragraph 4-40).
If OK, go step 2.

NOTE

- **When testing for voltage, negative lead from multimeter should be to ground (trailer frame).**
- **An assistant is required to push and hold the START button and SAFETY CIRCUIT BYPASS button.**

Step 2. Push START button and test for voltage at switch terminals. Is voltage present?

If NO, replace start switch (see paragraph 4-46), then start engine to verify malfunction has been corrected.

If YES, go to step 2.

Step 3. Push START button and test for voltage at magnetic starter switch. Is voltage present?

If NO, repair or replace wire from start switch to magnetic starter switch, then start engine to verify malfunction has been corrected.

If YES, replace magnetic starter switch (see paragraph 4-61), then start engine to verify malfunction has been corrected.

Step 4. Push START button and test for voltage at starter solenoid. Is voltage present?

If NO, replace wire from start switch to starter solenoid, then start engine verify malfunction has been corrected.

If YES, replace starter (see paragraph 4-39), then start engine to verify malfunction has been corrected.

2. ENGINE CRANKS SLOWLY.

Step 1. Test voltage of batteries (see TM 9-6140-200-14).

If NOT OK, charge or replace storage batteries (see paragraph 4-57).

If OK, go to step 2.

Table 4-3. Electrical Troubleshooting Procedures (Con't).

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Step 2. Check battery cables for proper size, freedom of corrosion, and proper installation.

If NOT OK, repair or replace wiring harness (see paragraph 4-63).

If OK, go to step 3.

NOTE

If ambient temperature is below 32°F (0°C) check that engine oil and diesel fuel ratings are correct.

Step 3. Test current draw of starter motor.

If NOT OK, replace starter (see paragraph 4-39).

If OK, start engine to verify malfunction has been corrected.

3. ENGINE CRANKS, BUT WILL NOT START.

NOTE

- **The engine must crank fast enough to obtain heat of combustion for ignition. If engine cranking speed is too slow, see Malfunction 2, ENGINE CRANKS SLOWLY.**
- **When testing for voltage, negative lead from multimeter should be to ground (trailer frame).**
- **Always replace wire with the same size (gage).**
- **An assistant is required to push and hold the START button and SAFETY CIRCUIT BYPASS button when testing voltage.**

Step 1. Push START button and test for voltage at shutdown relay. Is voltage present?

If NO, test and replace wiring to shutdown relay. Start engine to verify malfunction has been corrected.

If YES, replace shutdown relay (see paragraph 4-62). Start engine to verify malfunction has been corrected.

Step 2. Push START button and test for voltage at fuel solenoid valve. Is voltage present?

If NO, test and replace wiring to fuel solenoid valve. Start engine to verify malfunction has been corrected.

If YES, replace fuel solenoid valve (see paragraph 4-59). Start engine to verify malfunction has been corrected.

4. AMMETER INDICATES NO/LOW "CHARGE" CONDITION WITH ENGINE IDLING.

Step 1. Check for loose, broken or slipping alternator belt.

If OK, go to step 2.

If NOT OK, adjust or replace alternator belt (see paragraph 4-37). Start engine to verify malfunction has been corrected.

Table 4-3. Electrical Troubleshooting Procedures (Con't).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. Was charging system operating time limited?

If OK, go to step 3.

If NOT OK, charge batteries as necessary (see TM 9-6140-200-14). Start engine to verify malfunction has been corrected.

Step 3. Check for loose, dirty, or corroded terminals, leads, plugs, or connectors.

If OK, go to step 4.

If NOT OK, clean, repair, or replace terminals, leads, plugs, or connectors as required (see paragraph 4-63). Start engine and verify malfunction has been corrected.

Step 4. Check output condition of batteries (see TM 9-6140-200-14).

If OK, go to step 5.

If NOT OK, replace batteries (see paragraph 4-57). Start engine to verify malfunction has been corrected.

Step 5. With engine idling, check voltage at voltage regulator terminal.

If voltage is between 1.5–4 volts, replace alternator (see paragraph 4-36). Start engine and verify malfunction has been corrected.

If voltage is 24 volts, go to step 6.

Step 6. Perform voltage regulator test (open) (see paragraph 4-36).

If OK, start engine and verify malfunction has been corrected.

If NOT OK, replace voltage regulator (see paragraph 4-38). Start engine and verify malfunction has been corrected.

5. AMMETER INDICATES CONSTANT "CHARGE" CONDITION WITH ENGINE IDLING.

Step 1. Check for loose, dirty, or corroded regulator leads or terminals.

If OK, go to step 2.

If NOT OK, clean, repair, or replace as required (see paragraph 4-63). Start engine and verify malfunction has been corrected.

Step 2. Perform voltage regulator test (shorted) (see paragraph 4-36).

If OK, replace alternator (see paragraph 4-36). Start engine and verify malfunction has been corrected.

If NOT OK, replace voltage regulator (see paragraph 4-38). Start engine and verify malfunction has been corrected.

Section IV. ENGINE COMPONENT MAINTENANCE

Paragraph Number	Title	Page Number
4-11	Flywheel Inspection	4-19
4-12	Valve Cover Replacement	4-21
4-13	Valve Clearance Adjustment	4-22
4-14	Exhaust Manifold Replacement	4-24
4-15	Intake Manifold Replacement	4-25
4-16	Engine Air Cleaner Assembly Replacement	4-26

4-11. FLYWHEEL INSPECTION.

This Task Covers: Inspection

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit

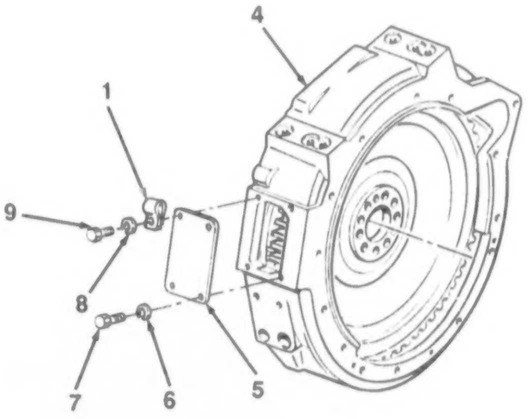
Materials/Parts:

- Four lockwashers

Personnel Required: Two

INSPECTION

1. Remove 2 bolts (7) and lockwashers (6) from cover (5) and flywheel housing (4). Discard lockwashers.
2. Remove 2 bolts (9), lockwashers (8), and clamps (1). Discard lockwashers.
3. Remove cover (5) from flywheel housing (4).



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4-11. FLYWHEEL INSPECTION (Con't).

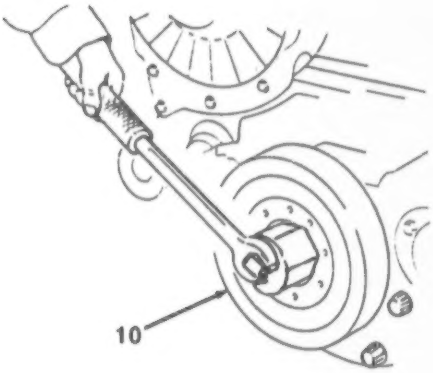
NOTE

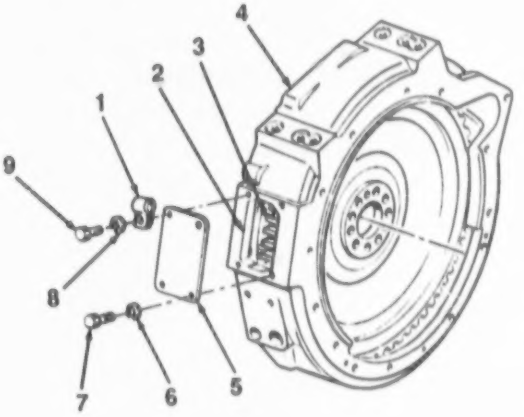
Steps 4 and 5 must be performed at the same time.

4. Turn crankshaft pulley (10) counterclockwise one complete revolution with 36 mm socket and breaker bar.

5. Inspect flywheel (3), through access hole (2) in flywheel housing (4), for cracks, chips, or broken gear teeth. If damaged, notify your supervisor.

6. Install cover (5) on flywheel housing (4). Install 2 bolts (7), new lockwashers (6), 2 bolts (9), new lockwashers (8), and clamps (1).





FOLLOW-ON TASKS:

- Close left door assembly.

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4-12. VALVE COVER REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- Sealing compound (Item 12, Appendix E)
- One gasket
- One shouldered washer

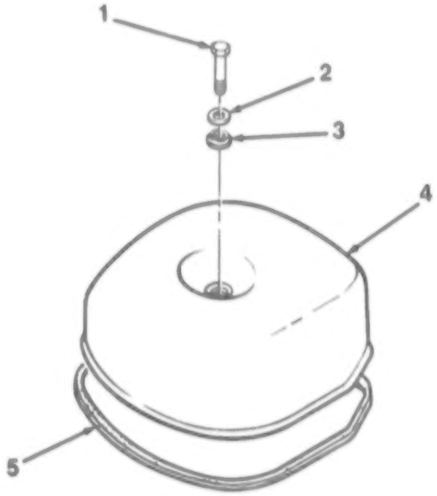
a. REMOVAL

1. Remove bolt (1), washer (2), and shouldered washer (3) from cover (4). Discard shouldered washer.

NOTE

Ensure that all gasket material is removed from cylinder head and cover.

2. Remove cover (4) and gasket (5). Discard gasket.



b. INSTALLATION

1. Apply sealing compound to new gasket (5). Install gasket in cover (4).
2. Install cover (4) on cylinder head.
3. Install bolt (1), washer (2), and new shouldered washer (3).

FOLLOW-ON TASKS:

- Close left and right door assemblies.

TA505425

4-13. VALVE CLEARANCE ADJUSTMENT.

This Task Covers: Adjustment

Initial Setup:

Equipment Conditions:

- Engine off and cool.
- Left and right door assemblies open.
- Battery cables disconnected (see paragraph 4-57).
- Valve covers removed (see paragraph 4-12).

Tools/Test Equipment:

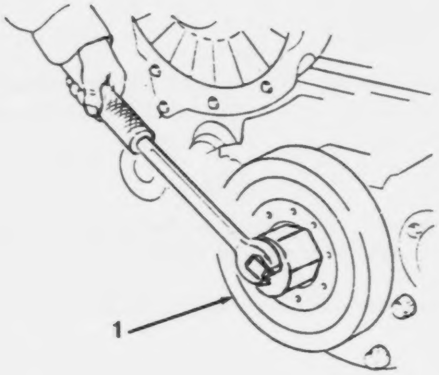
- General mechanic's tool kit
- Feeler gage

ADJUSTMENT

NOTE

To obtain accurate clearance reading, ensure that engine is cool during valve clearance adjustment.

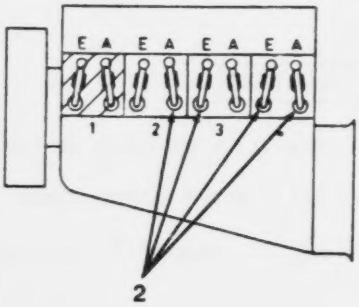
1. Turn crankshaft pulley (1) clockwise with 36 mm socket and breaker bar until both valves on No. 1 cylinder overlap (exhaust valve has not yet closed, while intake valve is opening).



2. Check valve clearance between rocker arm (5) and top of valve stem (6) of valves (2) in position 1 using Table 4-4 and a 0.15 mm (0.006 in.) feeler gage. If valve clearance is too wide or too narrow, perform step 3. If valve clearance is OK, go to step 5.

Table 4-4. Position 1.

Cylinder No.	Valve
2	Intake
3	Exhaust
4	Intake Exhaust



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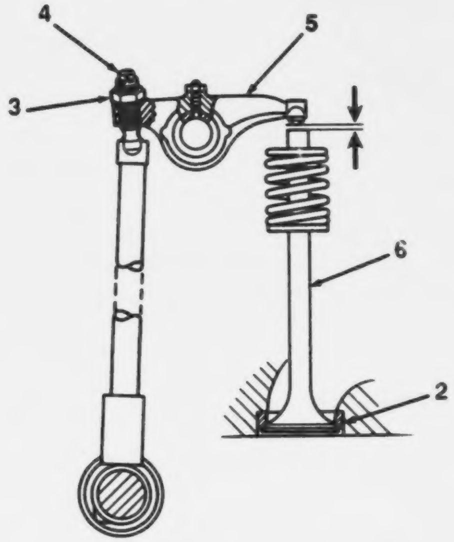
4-13. VALVE CLEARANCE ADJUSTMENT (Con't).

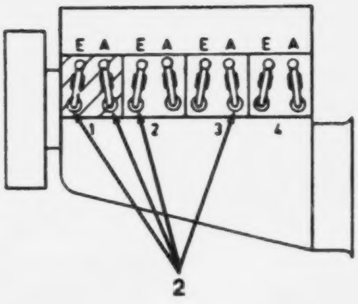
3. Loosen locknut (3) on rocker arm (5). Insert 0.15 mm (0.006 in.) feeler gage between rocker arm and top of valve stem (6). Turn setscrew (4) until a slight drag can be felt on feeler gage.
4. Tighten locknut (3) and check valve clearance. Repeat step 3 if necessary.
5. Turn crankshaft pulley (1) counterclockwise (direction of rotation) one complete revolution (360° from position 1).



6. Check valve clearance between rocker arm (5) and top of valve stem (6) of valves (2) in position 2 using Table 4-5 and a 0.15 mm (0.006 in.) feeler gage. If valve clearance is too wide or too narrow, repeat steps 3 and 4. If valve clearance is OK, go to step 7.

Table 4-5. Position 2.

Cylinder No.	Valve
1	Intake Exhaust
2	Exhaust
3	Intake



7. Check clearance of all valves and adjust if necessary.

FOLLOW-ON TASKS:

- Install valve covers (see paragraph 4-12).
- Connect battery cables (see paragraph 4-57).
- Close left and right door assemblies.

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4-14. EXHAUST MANIFOLD REPLACEMENT.

This Task Covers:

a. Removal
b. Inspection
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off and cool.
- Left and right door assemblies open.
- Muffler and pipes removed (see paragraph 4-31).

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- Four gaskets

a. REMOVAL

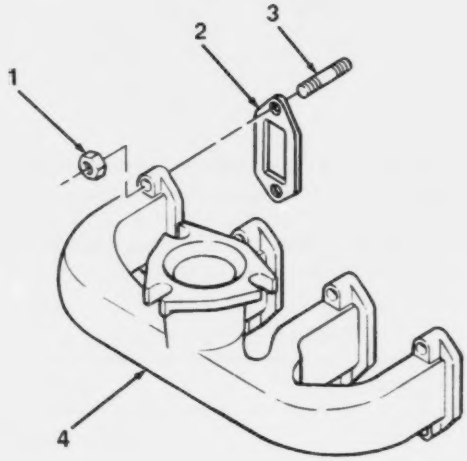
1. Remove 8 nuts (1) from studs (3) in cylinder heads.

2. Remove exhaust manifold (4) from studs (3).

NOTE

Ensure that all gasket material is removed from exhaust manifold and cylinder heads.

3. Remove 4 gaskets (2) from exhaust manifold (4) and cylinder heads. Discard gaskets.



b. INSPECTION

1. Inspect exhaust manifold (4) for cracks or damage. Replace exhaust manifold if cracked or damaged.

c. INSTALLATION

1. Place 4 new gaskets (2) over studs (3) in cylinder heads.
2. Position exhaust manifold (4) on studs (3).
3. Install 8 nuts (1) on studs (3).

FOLLOW-ON TASKS:

- Install muffler and pipes (see paragraph 4-31).
- Close left and right door assemblies.

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4-15. INTAKE MANIFOLD REPLACEMENT.

This Task Covers:

a. Removal
b. Inspection
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off and cool.
- Left and right door assemblies open.
- Muffler and pipes removed (see paragraph 4-31).

Materials/Parts:

- Four gaskets

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Loosen clamp (1) and remove air intake hose (2) from intake manifold (3).
2. Remove engine starting aid line (8) from intake manifold (3).
3. Remove 8 nuts (5), washers (4), and intake manifold (3) from studs (6).

NOTE

Ensure that all gasket material is removed from intake manifold and cylinder heads.

4. Remove 4 gaskets (7) from intake manifold (3) and cylinder heads. Discard gaskets.

b. INSPECTION

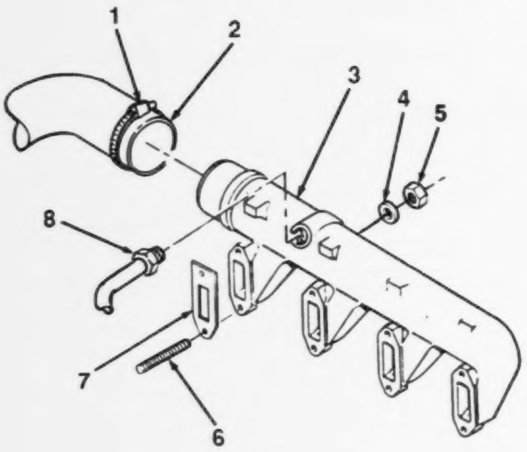
1. Inspect intake manifold (3) for cracks or damage. Replace intake manifold if cracked or damaged.

c. INSTALLATION

1. Place 4 new gaskets (7) over studs (6) in cylinder heads.
2. Position intake manifold (3) on studs (6).
3. Install 8 nuts (5) and washers (4) on studs (6).
4. Install engine starting aid line (8) in intake manifold (3).
5. Install air intake hose (2) on intake manifold (3) and tighten clamp (1).

FOLLOW-ON TASKS:

- Install muffler and pipes (see paragraph 4-31).
- Close left and right door assemblies.



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4-16. ENGINE AIR CLEANER ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Engine air cleaner filter element removed (see paragraph 3-4).

Materials/Parts:

- Two lockwashers

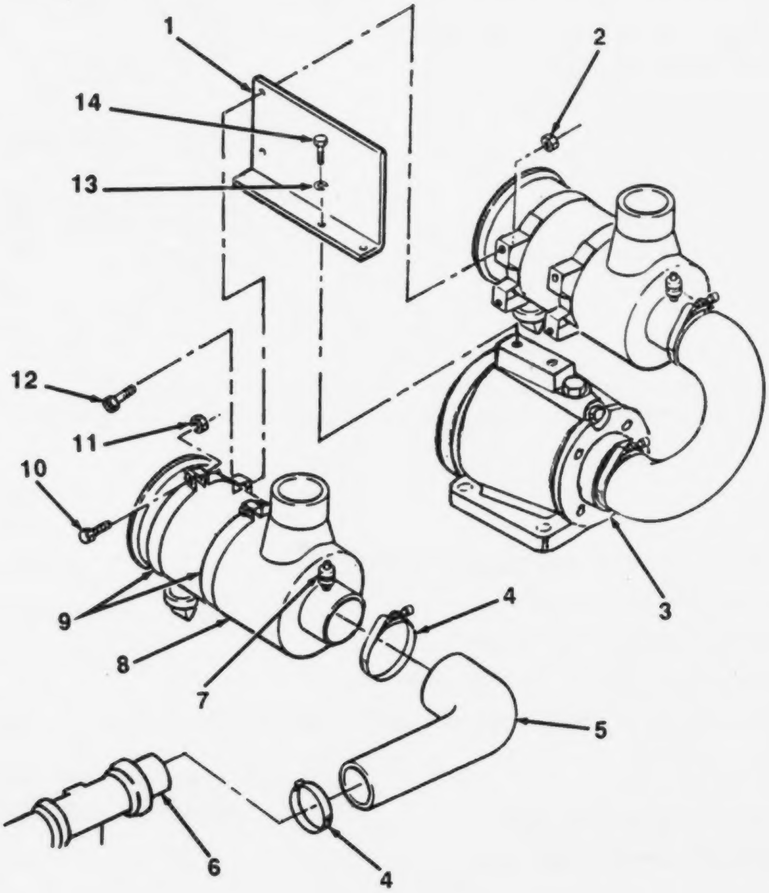
Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Loosen 2 clamps (4) on hose (5). Remove hose and clamps from air cleaner body (8) and intake manifold (6).

2. Remove 2 bolts (10) and nuts (11) from clamps (9). Remove air cleaner body (8) from clamps.



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4-16. ENGINE AIR CLEANER ASSEMBLY REPLACEMENT (Con't).

3. Remove restriction indicator (7) from air cleaner body (8).
4. Remove 4 nuts (2) and capscrews (12) from bracket (1).
5. Remove 2 bolts (14) and lockwashers (13) from bracket (1) and unloader valve assembly (3). Discard lockwashers.
6. Remove bracket (1).

b. INSTALLATION

1. Position bracket (1) on unloader valve assembly (3). Install 2 bolts (14) and new lockwashers (13) in bracket. Tighten bolts to 58 lb.-ft. (78 N•m).
2. Install 2 clamps (9) on bracket (1) with 4 capscrews (12) and nuts (2).
3. Install restriction indicator (7) in air cleaner body (8).
4. Position air cleaner body (8) in clamps (9) and install 2 bolts (10) and nuts (11).
5. Install hose (5) and 2 clamps (4) on intake manifold (6) and air cleaner body (8). Tighten clamps.

FOLLOW-ON TASKS:

- Install engine air cleaner filter element (see paragraph 3-4).
- Close left and right door assemblies.

Section V. ENGINE LUBRICATION SYSTEM MAINTENANCE

Paragraph Number	Title	Page Number
4-17	Oil Cooler Replacement	4-29
4-18	Engine Oil Filter Element Replacement	4-31
4-19	Oil Filter Base Assembly Replacement	4-33
4-20	Oil Line Replacement	4-35

4-17. OIL COOLER REPLACEMENT.

This Task Covers:

a. Removal
b. Inspection
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Cooling duct and stay plate removed (see paragraph 4-34).

Materials/Parts:

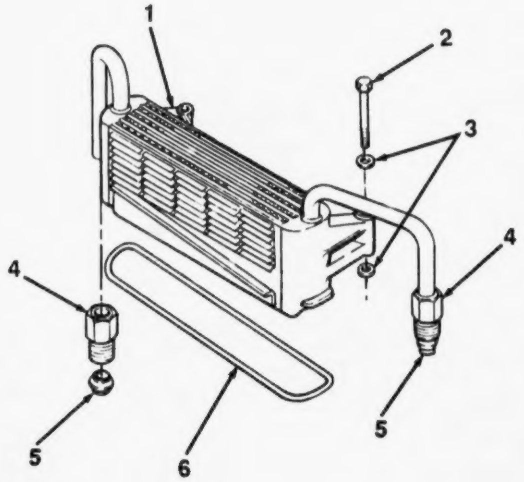
- One gasket

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Loosen 2 fittings (4). Remove 2 bolts (2) and 4 washers (3) from oil cooler (1).
2. Unscrew 2 fittings (4) and remove oil cooler (1).
3. Remove gasket (6) from bottom of oil cooler (1). Discard gasket.



b. INSPECTION

1. Inspect oil cooler (1) for cracks, bends, breaks, or leakage. Replace oil cooler if damaged.
2. Inspect compression sleeves (5) for cracks or damage. Replace compression sleeves if cracked or damaged.

c. INSTALLATION

1. Install new gasket (6) on bottom of oil cooler (1).
2. Position oil cooler (1) on engine and tighten 2 fittings (4).
3. Install 2 bolts (2) and 4 washers (3) in oil cooler (1).

TA505431

4-17. OIL COOLER REPLACEMENT (Con't).

FOLLOW-ON TASKS:

- Install cooling duct and stay plate (see paragraph 4-34).
- Start unit and check for leaks (see paragraph 2-12).
- Close left door assembly.

4-18. ENGINE OIL FILTER ELEMENT REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit
- Filter strap wrench

General Safety Instructions:

- Dry cleaning solvent is flammable and must not be used near open flame. Use only in a well-ventilated area.

Materials/Parts:

- Dry cleaning solvent (Item 3, Appendix E)
- Lubrication oil (Item 8, Appendix E)
- Rag (Item 11, Appendix E)
- One oil filter element

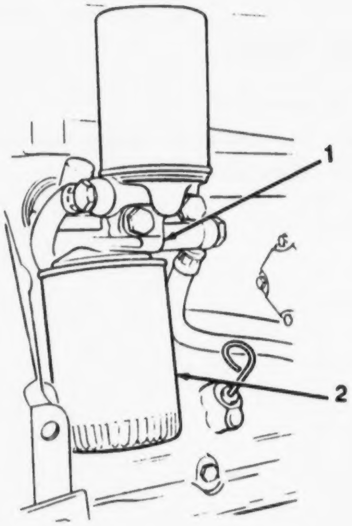
a. REMOVAL

1. Remove oil filter element (2) from filter base assembly (1) with filter strap wrench. Discard oil filter element.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F–130°F (38°C–59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

2. Clean dirt and grease from filter base assembly (1) with dry cleaning solvent and a rag.



TA505432

4-18. ENGINE OIL FILTER ELEMENT REPLACEMENT (Con't).

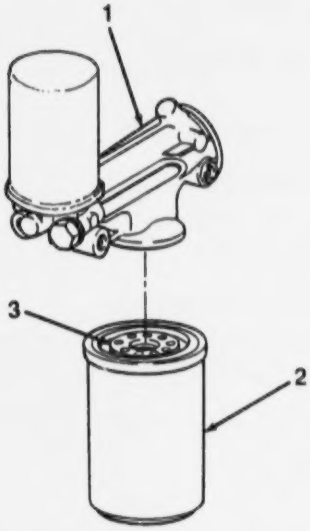
b. INSTALLATION

1. Apply a thin film of new oil on new oil filter gasket (3).

CAUTION

Do not overtighten oil filter element. Overtightening oil filter element can cause oil to leak and result in severe engine damage.

2. Screw new oil filter element (2) in place on filter base assembly (1) until oil filter gasket (3) contacts filter base assembly. Tighten oil filter element ¾-turn more with filter strap wrench.



FOLLOW-ON TASKS:

- Check oil level.
- Start unit and check for leaks (see paragraph 2-12).
- Close left door assembly.

TA505433

4-19. OIL FILTER BASE ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Engine oil filter element removed (see paragraph 4-18).
- Fuel filter element removed (see paragraph 4-26).

Materials/Parts:

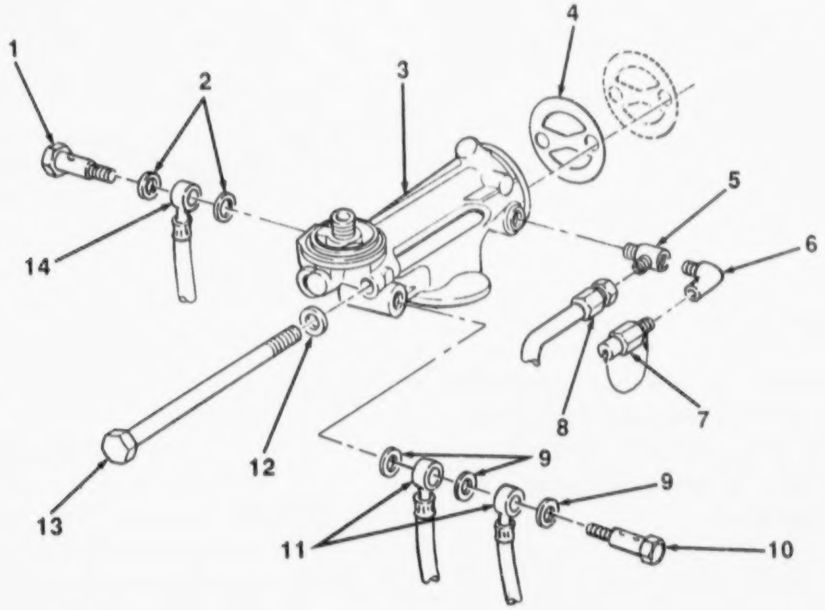
- Sealing compound (Item 12, Appendix E)
- One gasket
- Five copper washers

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Remove 2 fluid passage bolts (1 and 10) and 5 copper washers (2 and 9) from 2 fuel lines (11), fuel line (14), and filter base assembly (3). Discard copper washers.
2. Remove oil line (8) from tee (5), elbow (6), and restrictor (7).
3. Remove 2 bolts (13) and washers (12) from filter base assembly (3).
4. Remove filter base assembly (3) and gasket (4). Discard gasket.
5. Remove tee (5), elbow (6), and restrictor (7) from filter base assembly (3).

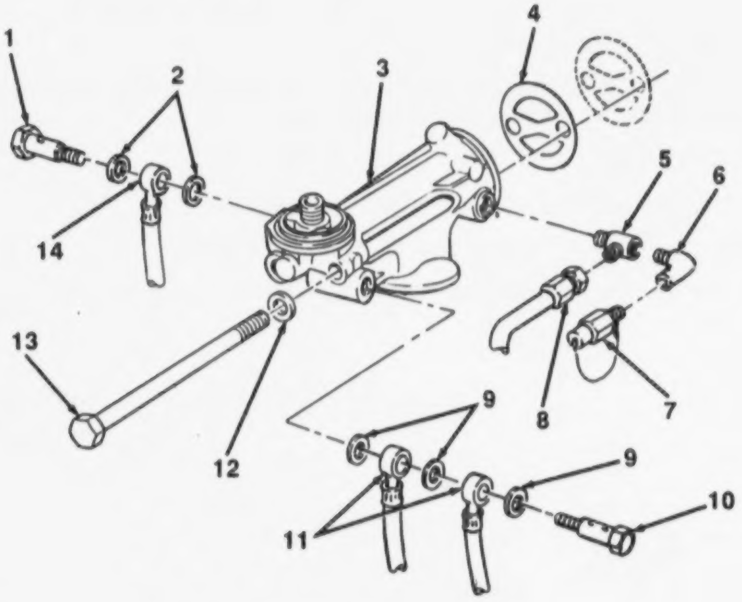


TA505434

4-19. OIL FILTER BASE ASSEMBLY REPLACEMENT (Con't).

b. INSTALLATION

1. Install tee (5), elbow (6), and restrictor (7) on filter base assembly (3).
2. Apply sealing compound on new gasket (4). Position gasket on filter base assembly (3).
3. Position filter base assembly (3) and gasket (4) and install 2 bolts (13) and washers (12).
4. Install oil line (8) on tee (5).
5. Install 2 fluid passage bolts (1 and 10), 5 new copper washers (2 and 9), 2 fuel lines (11), and fuel line (14) in filter base assembly (3).



FOLLOW-ON TASKS:

- Install engine oil filter element (see paragraph 4-18).
- Install fuel filter element (see paragraph 4-26).
- Check engine oil level (see LO 5-4310-452-12).
- Start unit and check for leaks (see paragraph 2-12).
- Close left door assembly.

TA505435

4-20. OIL LINE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Oil filter base assembly removed (see paragraph 4-19).
- Oil cooler removed (see paragraph 4-17).
- Metering fuel pump removed (see paragraph 4-22).

Materials/Parts:

- Four copper washers

Tools/Test Equipment:

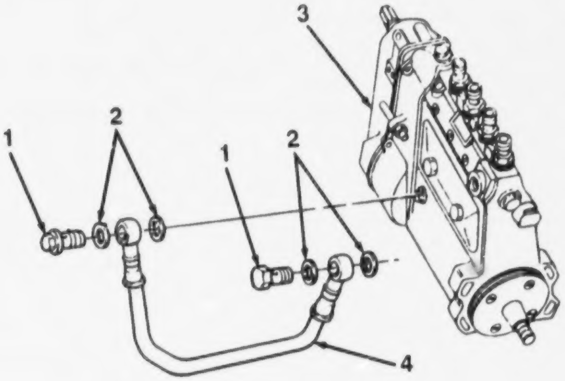
- General mechanic's tool kit

a. REMOVAL

1. Remove 2 fluid passage bolts (1) and 4 copper washers (2) from oil line (4). Discard copper washers.
2. Remove oil line (4) from fuel injection pump (3).

b. INSTALLATION

1. Position oil line (4) on fuel injection pump (3).
2. Install 2 fluid passage bolts (1) and 4 new copper washers (2) in oil line (4) and fuel injection pump (3).



FOLLOW-ON TASKS:

- Install oil filter base assembly (see paragraph 4-19).
- Install metering fuel pump (see paragraph 4-22).
- Install oil cooler (see paragraph 4-17).
- Close left door assembly.

TA505436

Section VI. ENGINE FUEL SYSTEM MAINTENANCE

Paragraph Number	Title	Page Number
4-21	Fuel System Bleeding	4-37
4-22	Metering Fuel Pump Maintenance	4-39
4-23	Fuel Tank Maintenance	4-42
4-24	Fuel Lines and Fittings Replacement	4-44
4-25	Engine Throttle Control Maintenance	4-46
4-26	Fuel Filter Element Replacement	4-49
4-27	Fuel/Water Separator Element Maintenance	4-50
4-28	Engine Starting Aid Replacement	4-52
4-29	Engine Stop Cable Replacement	4-54

4-21. FUEL SYSTEM BLEEDING.

This Task Covers: Bleeding

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.

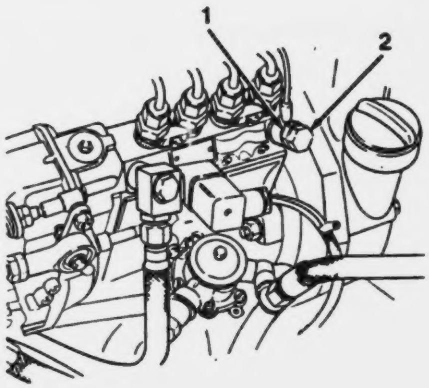
Tools/Test Equipment:

- General mechanic's tool kit

Personnel Required: Two

BLEEDING

1. Loosen overflow valve (1) from lower hex (2) 2-6 turns.



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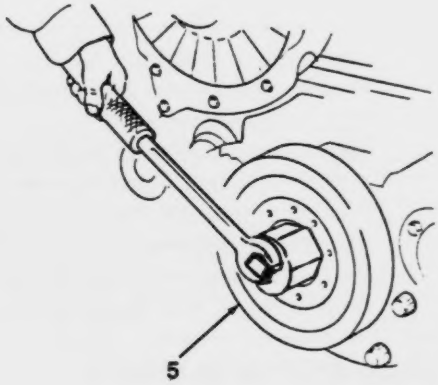
4-21. FUEL SYSTEM BLEEDING (Con't).

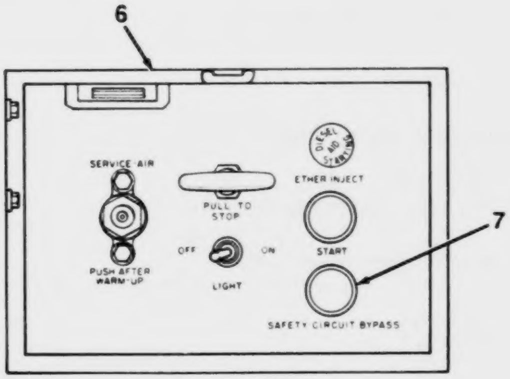
NOTE

When bleeding the fuel system, you are actually moving the fuel pump by hand. If no resistance is felt when pumping the fuel pump priming lever, perform step 2 until resistance is felt. If resistance is felt, go to step 3.

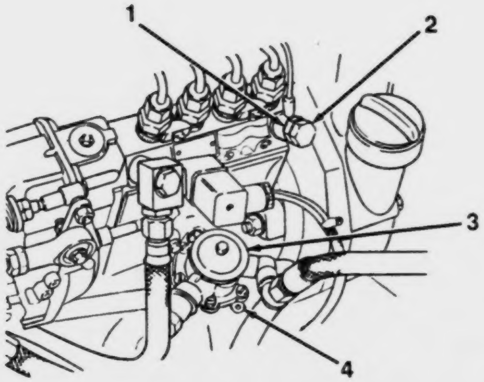
2. Turn crankshaft pulley (5) clockwise, in ¼-turn increments, with 36 mm socket and breaker bar until resistance is felt on priming lever (4).



3. Depress the safety circuit bypass button (7) on the control panel (6) and pump the priming lever (4) on fuel pump (3) at the same time until there are no bubbles in the fuel coming from the overflow valve (1).



4. Tighten overflow valve (1) against the lower hex (2).



FOLLOW-ON TASKS:

- Close left door assembly.

TA505438

4-22. METERING FUEL PUMP MAINTENANCE.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit
- Soft bristle brush

Materials/Parts:

- Dry cleaning solvent (Item 3, Appendix E)
- Rag (Item 11, Appendix E)
- Fuel pump parts kit
- One gasket
- Three lockwashers

General Safety Instructions:

- Dry cleaning solvent is flammable and must not be used near open flame. Use only in a well-ventilated area.

4-22. METERING FUEL PUMP MAINTENANCE (CON'T).

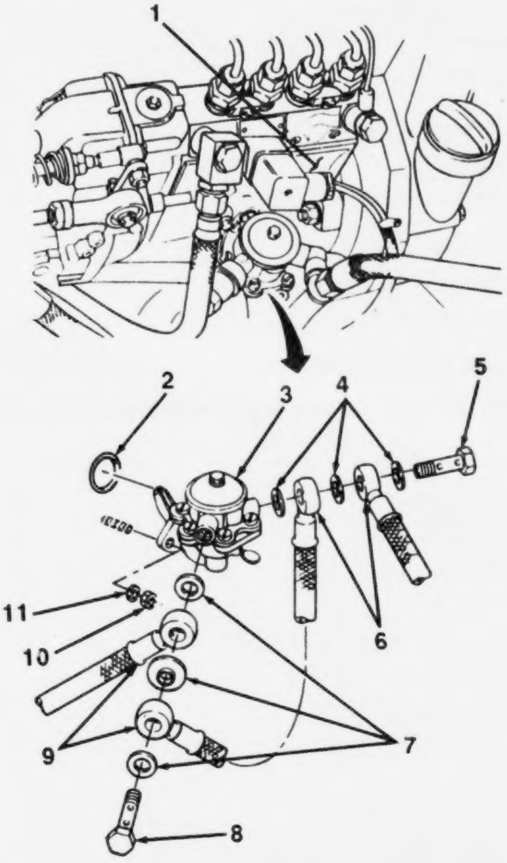
a. REMOVAL

1. Remove fluid passage bolt (5), 3 washers (4), and 2 hoses (6) from metering fuel pump (3).

NOTE

Fluid passage bolt includes an internal check valve.

2. Remove fluid passage bolt (8), 3 washers (7), and 2 hoses (9) from metering fuel pump (3).
3. Remove 3 nuts (10) and lockwashers (11) from metering fuel pump (3). Remove metering fuel pump and gasket (2) from injection pump drive assembly (1). Discard gasket and lockwashers.



b. DISASSEMBLY

1. Remove capscrew (12) and washer (13) from metering fuel pump (3).
2. Remove cover (14), preformed packing (15), and strainer (16) from metering fuel pump (3). Discard preformed packing.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F–130°F (38°C–59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

3. Clean strainer (16) with dry cleaning solvent and a brush. Dry strainer with a rag.

TA505439

4-22. METERING FUEL PUMP MAINTENANCE (CON'T).

4. Inspect strainer (16) for cracks or breaks. Replace strainer if damaged.

c. ASSEMBLY

1. Position strainer (16), new preformed packing (15), and cover (14) on metering fuel pump (3).
2. Install capscrew (12) and washer (13) in metering fuel pump (3).

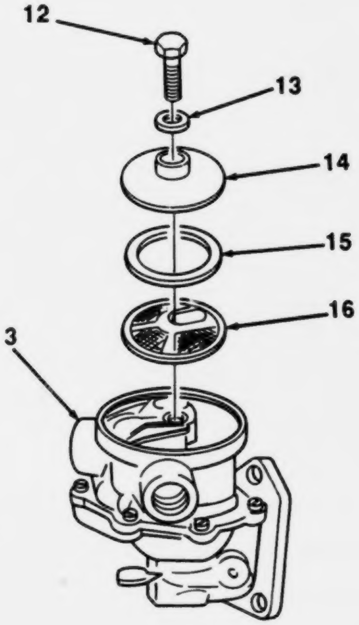
d. INSTALLATION

1. Position new gasket (2) and metering fuel pump (3) on injection pump drive assembly (1). Install 3 nuts (10) and new lockwashers (11).

NOTE

Fluid passage bolt includes an internal check valve.

2. Position 2 hoses (9) on metering fuel pump (3). Install 3 washers (7) and fluid passage bolt (8) in metering fuel pump.
3. Position 2 hoses (6) on metering fuel pump (3). Install 3 washers (4) and fluid passage bolt (5) in metering fuel pump.



FOLLOW-ON TASKS:

- Bleed fuel system (see paragraph 4-21).
- Start unit and check for leaks (see paragraph 2-12).
- Close left door assembly.

TA505440

4-23. FUEL TANK MAINTENANCE.

This Task Covers:

a. Removal	c. Assembly
b. Disassembly	d. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Fuel tank drained (see LO 5-4310-452-12).
- Fuel/water separator removed from baffle (see paragraph 4-27).

Personnel Required: Two

Materials/Parts:

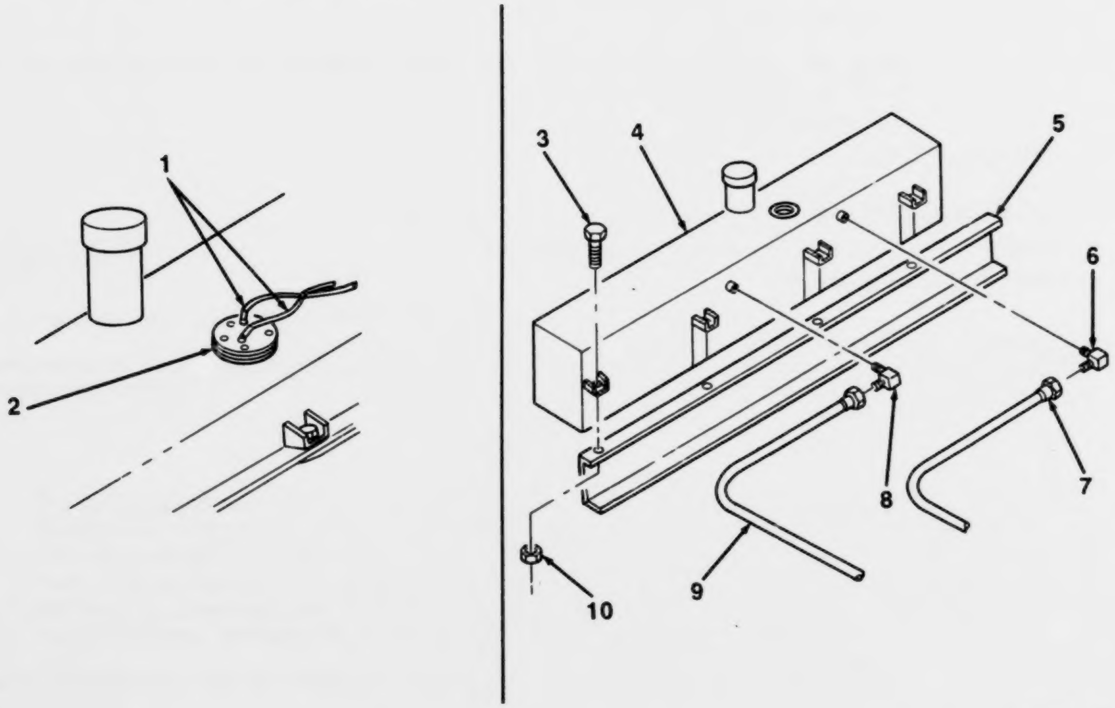
- One filler opening cap

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Disconnect sending unit electrical leads (1) from fuel tank sending unit (2).
2. Disconnect fuel line (7) from elbow (6). Remove elbow from fuel tank (4).
3. Disconnect fuel line (9) from elbow (8). Remove elbow from fuel tank (4).
4. Remove 4 bolts (3) and nuts (10) from fuel tank (4) and trailer frame (5).
5. Remove fuel tank (4) from trailer frame (5).

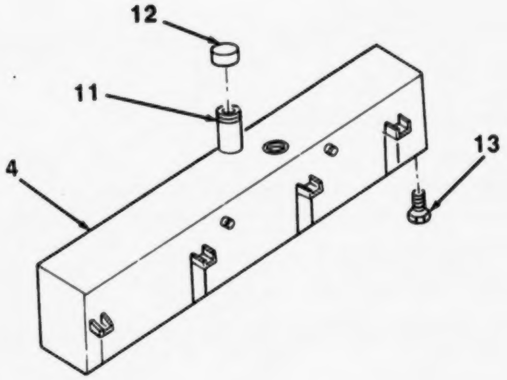


TA505441

4-23. FUEL TANK MAINTENANCE (Con't).

b. DISASSEMBLY

1. Unscrew and remove filler opening cap (12) from filler tube (11). Discard filler opening cap.
2. Remove pipe plug (13) from fuel tank (4).
3. Remove fuel tank transmitter (see paragraph 4-44).



c. ASSEMBLY

1. Install fuel tank transmitter (see paragraph 4-44).
2. Install pipe plug (13) in fuel tank (4).
3. Install new filler opening cap (12) to filler tube (11).

d. INSTALLATION

1. Position fuel tank (4) on trailer frame (5).
2. Install 4 bolts (3) and nuts (10) in fuel tank (4) and trailer frame (5).
3. Install elbow (8) in fuel tank (4). Connect fuel line (9) on elbow.
4. Install elbow (6) in fuel tank (4). Connect fuel line (7) on elbow.
5. Connect sending unit electrical leads (1) to fuel tank sending unit (2).

FOLLOW-ON TASKS:

- Install fuel/water separator on baffle (see paragraph 4-27).
- Fill fuel tank (see LO 5-4310-452-12).
- Start unit and check for leaks (see paragraph 2-12).
- Close left door assembly.

TA505442

4-24. FUEL LINES AND FITTINGS REPLACEMENT.

This Task Covers:

a. Inspection
b. Removal
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.

Tools/Test Equipment:

- General mechanic's tool kit

a. INSPECTION

1. Inspect fuel lines (5, 10, and 14) for signs of leaks, cracks, or deterioration. Replace if necessary.

b. REMOVAL

NOTE

- **To remove fuel line (5), perform steps 1 and 2.**
- **To remove fuel line (10), perform steps 3 and 4.**
- **To remove fuel line (14), perform steps 5 and 6.**

1. Disconnect fuel line (5) from elbow (2) on side of fuel tank (1). Disconnect fuel line from elbow (6) and check valve (7) on engine (8).
2. Remove capscrew (3) and clamp (4) from fuel line (5). Remove fuel line.
3. Disconnect fuel line (10) from elbow (12) on fuel/water separator (11).
4. Disconnect fuel line (10) from elbow (9) on side of engine (8). Remove fuel line.
5. Disconnect fuel line (14) from elbow (13) on fuel/water separator (11).
6. Disconnect fuel line (14) from elbow (15) on side of fuel tank (1). Remove fuel line.

c. INSTALLATION

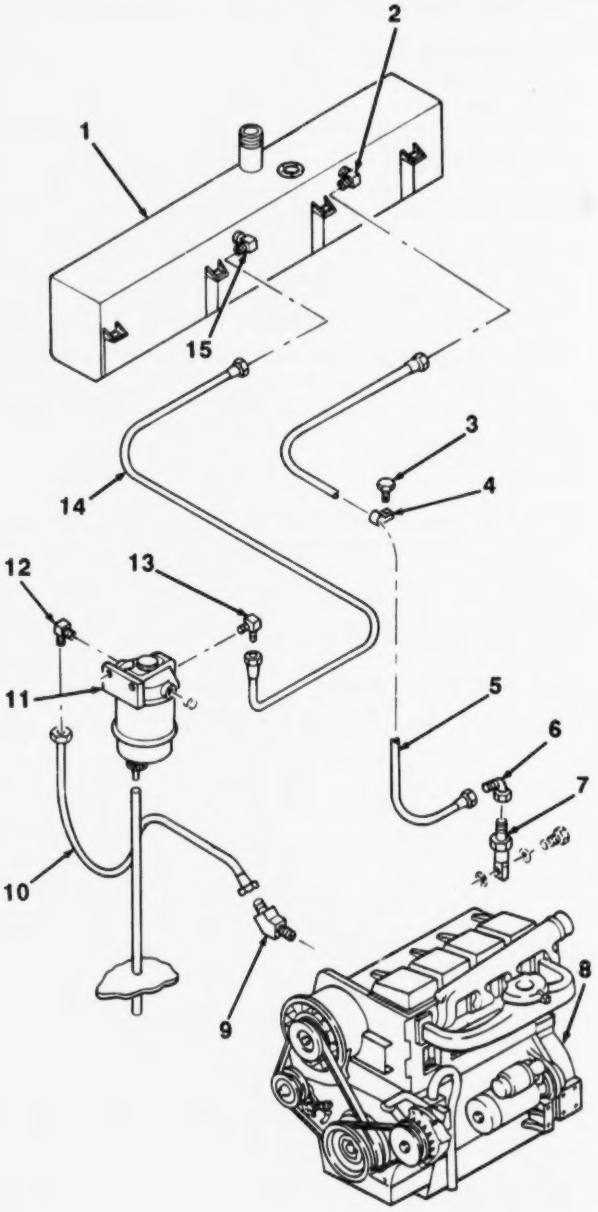
NOTE

- **To install fuel line (14), perform steps 1 and 2.**
- **To install fuel line (10), perform steps 3 and 4.**
- **To install fuel line (5), perform steps 5 through 7.**

1. Connect fuel line (14) to elbow (15) on side of fuel tank (1).
2. Connect fuel line (14) to elbow (13) on fuel/water separator (11).
3. Connect fuel line (10) to elbow (12) on fuel/water separator (11).

4-24. FUEL LINES AND FITTINGS REPLACEMENT (Con't).

4. Connect fuel line (10) to elbow (9) on side of engine (8).
5. Connect fuel line (5) to elbow (6) and check valve (7) on engine (8).
6. Connect fuel line (5) to elbow (2) on side of fuel tank (1).
7. Install capscrew (3) and clamp (4) on fuel line (5).



FOLLOW-ON TASKS:

- Close left and right door assemblies.

TA505443

4-25. ENGINE THROTTLE CONTROL MAINTENANCE.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Adjustment

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- System pressure relieved.
- Air fittings and lines removed (see paragraph 4-98).

Materials/Parts:

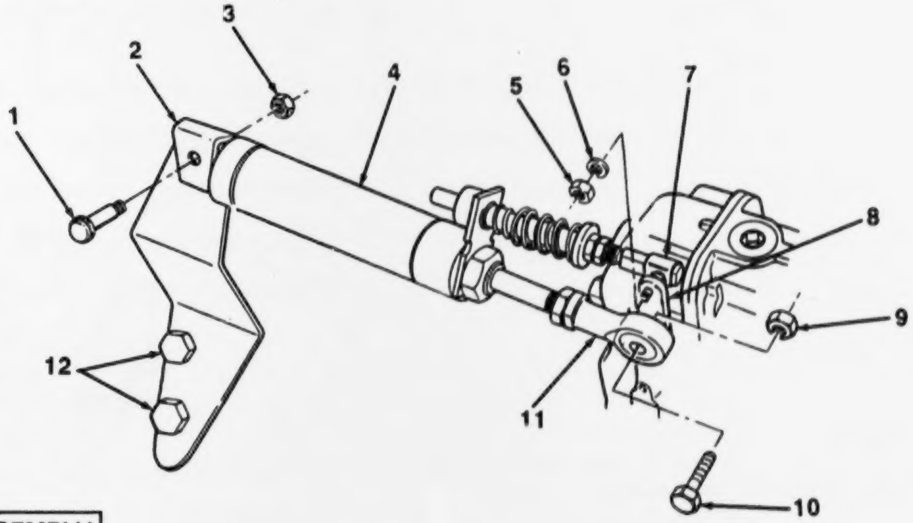
- One lockwasher

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Remove nut (5) and lockwasher (6) from spring rod ball joint (7). Remove spring rod ball joint from throttle arm (8). Discard lockwasher.
2. Remove screw (10) and nut (9) from air cylinder assembly rod end (11).
3. Remove screw (1), nut (3), and air cylinder assembly (4) from bracket (2).
4. Remove 2 screws (12) and bracket (2).



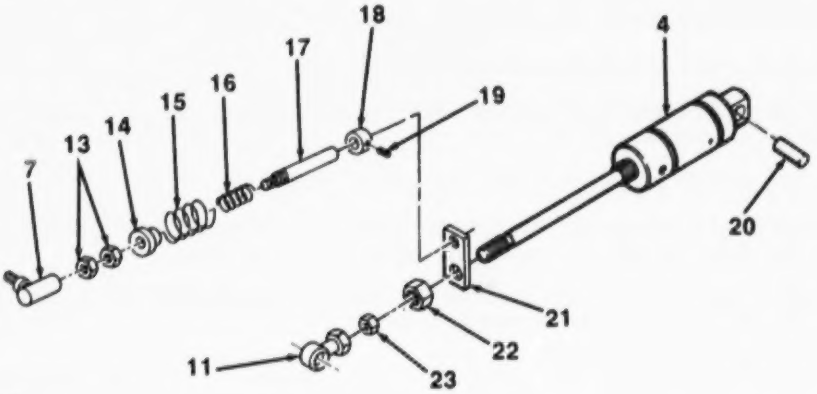
b. DISASSEMBLY

1. Remove spring rod ball joint (7), 2 nuts (13), seat (14), spring (15), and spring (16) from shaft (17).
2. Remove shaft (17) with collar (18) from retaining plate (21).
3. Remove screw (19) and collar (18) from shaft (17).

TA505444

4-25. ENGINE THROTTLE CONTROL MAINTENANCE (Con't).

4. Remove rod end (11), jamnut (23), nut (22), and retaining plate (21) from cylinder (4).
5. Remove sleeve (20) from cylinder (4).



c. ASSEMBLY

1. Install sleeve (20) in cylinder (4).
2. Install retaining plate (21) on cylinder (4) with nut (22). Hand tighten nut.
3. Install jamnut (23) and rod end (11) on cylinder (4) rod.
4. Install collar (18) on shaft (17) with screw (19). About ¼ in. (6.35 mm) of shaft should be visible.
5. Install spring (16), spring (15), seat (14), on shaft (17) with 2 nuts (13).
6. Install spring rod ball joint (7) on threaded end of shaft (17).

d. INSTALLATION

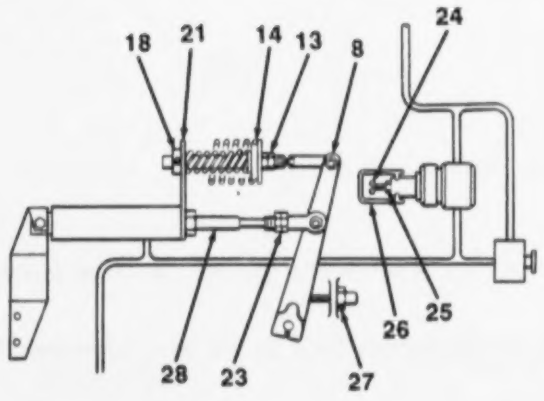
1. Position air cylinder assembly (4) in bracket (2).
2. Install screw (1) and nut (3) in air cylinder assembly (4) and bracket (2).
3. Install bracket (2) with 2 screws (12).
4. Line up rod end (11) with lower hole in throttle arm (8). Install screw (10) and nut (9) in rod end and throttle arm.
5. Install spring rod ball joint (7) in upper hole of throttle arm (8) and install nut (5) and new lockwasher (6).
6. Install air lines and fittings (see paragraph 4-98).

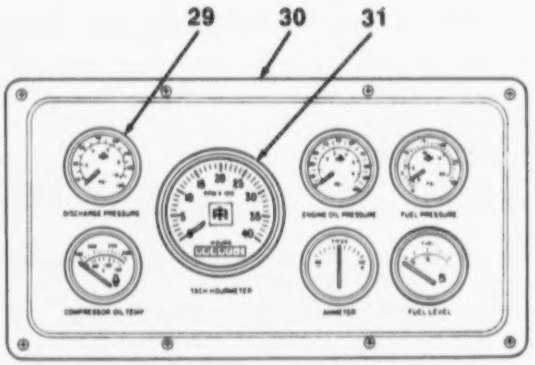
TA505445

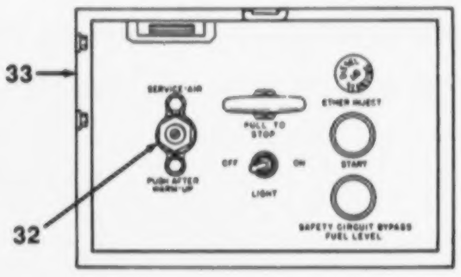
4-25. ENGINE THROTTLE CONTROL MAINTENANCE (Con't).

e. ADJUSTMENT

1. Make sure throttle arm (8) is resting on full speed stop (27).
2. Loosen 2 nuts (13) until spring tension is fully relieved.
3. Remove regulator cover (26) and loosen jamnut (25).
4. Turn adjusting screw (24) counterclockwise until no tension is felt on adjusting screw, then turn adjusting screw clockwise one full turn.
5. Start engine and allow it to warm up (see paragraph 2-12).
6. When discharge pressure gage (29) on indicator panel (30) reaches 50 psi (350 kPa) and the engine is warm, press the SERVICE-AIR button (32) on the control panel (33).
7. When discharge pressure gage (29) reaches 80-120 psi (550-825 kPa) turn adjusting screw (24) until throttle arm (8) just comes off full speed stop (27).
8. Tighten jamnut (25).
9. Pull out SERVICE-AIR button (32) to close valve.
10. Loosen jamnut (23) and turn air cylinder assembly shaft (28) until idle speed on TACH/HOURMETER (31) on indicator panel (30) indicates 1400 rpm.
11. Tighten jamnut (23).
12. Tighten 2 nuts (13) until distance between retaining plate (21) and seat (14) is 2.375 inches (60.3 mm).
13. Adjust collar (18) until full load idle speed on TACH/HOURMETER (31) is 2500 rpm.
14. Shut down engine (see paragraph 2-13).







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FOLLOW-ON TASKS:

- Close left door assembly.

4-26. FUEL FILTER ELEMENT REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.

Tools/Test Equipment:

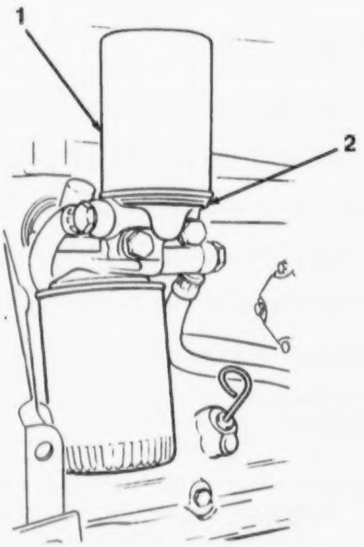
- General mechanic's tool kit
- Filter strap wrench

Materials/Parts:

- Diesel fuel (Item 4, Appendix E)
- One fuel filter element

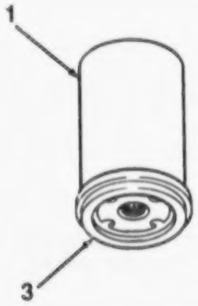
a. REMOVAL

1. Unscrew fuel filter element (1) from filter base assembly (2) with filter strap wrench. Discard fuel filter element.



b. INSTALLATION

1. Apply a thin film of diesel fuel on gasket (3) in recess of new fuel filter element (1).



2. Install fuel filter element (1) on filter base assembly (2) with filter strap wrench until gasket (3) seats, then turn ½-turn more.
3. Bleed fuel system (see paragraph 4-21).
4. Start unit and check fuel filter element (1) for leaks (see paragraph 2-12).

FOLLOW-ON TASKS:

- Close left door assembly.

TA505447

4-27. FUEL/WATER SEPARATOR ELEMENT MAINTENANCE.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit
- Suitable container

Materials/Parts:

- Lubricating oil (Item 9, Appendix E)
- Rag (Item 11, Appendix E)
- One gasket
- One probe
- One separator element
- One washer
- Three preformed packings

a. REMOVAL

1. Place suitable container under trailer at bottom end of drain hose (8).
2. Remove fuel lines and fittings (see paragraph 4-24).
3. Loosen drain assembly knob (7) and drain fuel/water separator (2).
4. Remove sight bowl (6) and separator element (4) from head (15).
5. Remove 2 screws (1), nuts (3), and head (15) from baffle.
6. Remove suitable container from under trailer.

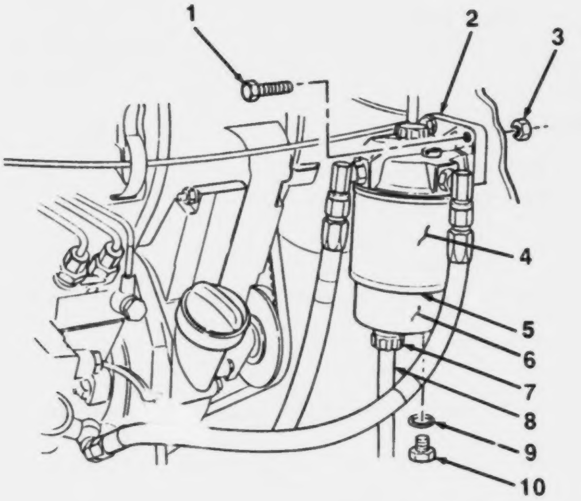
b. DISASSEMBLY

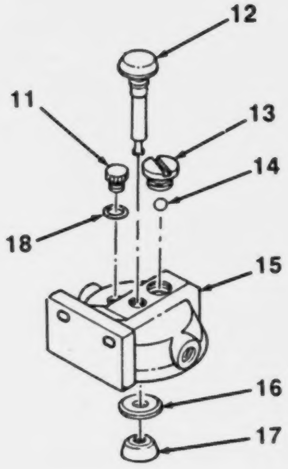
1. Remove drain hose (8) from drain assembly knob (7). Remove sight bowl (6) and preformed packing (5) from separator element (4). Discard preformed packing and separator element.
2. Remove drain assembly knob (7) and plug (10) from sight bowl (6). Remove preformed packing (9) from plug. Discard preformed packing.
3. Remove vent plug (11) from head (15). Remove and discard preformed packing (18).
4. Remove cap (13) and ball check (14) from head (15).
5. Remove probe (12), gasket (17), and washer (16) from head (15). Discard probe, gasket, and washer.
6. Dry sight bowl (6) with clean rag.

c. ASSEMBLY

1. Install new probe (12), washer (16), and gasket (17) in head (15).
2. Install ball check (14) and cap (13) in head (15).

4-27. FUEL/WATER SEPARATOR ELEMENT MAINTENANCE (Con't).





3. Install new preformed packing (18) on vent plug (11) and install in head (15).
4. Install new preformed packing (9) on plug (10) and install in sight bowl (6).
5. Install drain assembly knob (7) on sight bowl (6).
6. Install sight bowl (6) with new preformed packing (5) on new separator element (4).
7. Install head (15) on baffle with 2 screws (1) and nuts (3).
8. Apply a light film of lubricating oil on separator element (4) gasket and install on head (15).
9. Install drain hose (8) on drain assembly knob (7). Close drain assembly knob.

d. INSTALLATION

1. Install fuel lines and fittings (see paragraph 4-24).
2. Loosen probe (12). Pump probe until pressure is felt and sight bowl is full of fuel. Tighten probe.

FOLLOW-ON TASKS:

- Bleed fuel system (see paragraph 4-21).
- Start unit and check for leaks (see paragraph 2-12).
- Close left door assembly.

TA505448

4-28. ENGINE STARTING AID REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- Two self-locking screws
- Six lockwashers

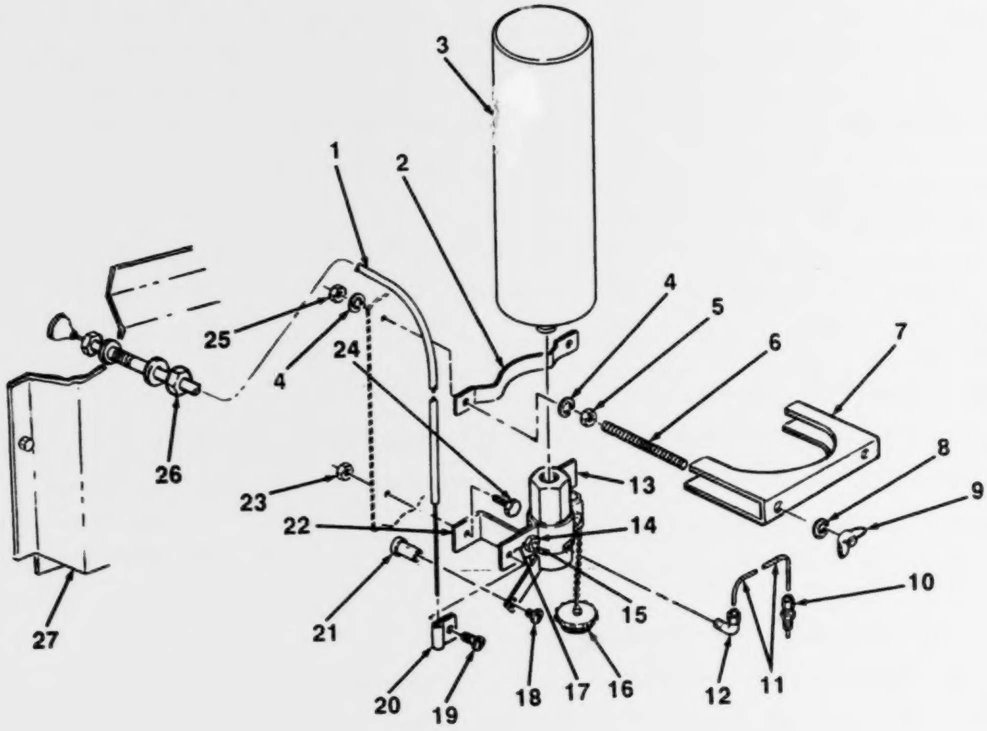
a. REMOVAL

1. Remove 2 wingnuts (9), lockwashers (8), and bracket (7) from cylinder (3). Discard lockwashers.
2. Unscrew and remove cylinder (3) from cold start valve (13). Install cap (16) on cold start valve.
3. Remove 2 nuts (5), 4 lockwashers (4), 2 nuts (25), studs (6), and bracket (2). Discard lockwashers.
4. Loosen screws (18 and 19) from clamps (20 and 21). Remove control cable (1) from clamps.
5. Remove nut (26) and remove control cable (1) through panel (27).
6. Unscrew tube nuts and remove tube (11) from injector (10) and elbow (12).
7. Unscrew 2 nuts (14) and self-locking screws (15). Remove bracket (17) and cold start valve (13). Discard self-locking screws.
8. Remove 2 screws (24), nuts (23), and bracket (22).
9. Unscrew and remove injector (10) from intake manifold.
10. Remove elbow (12) from cold start valve (13).

b. INSTALLATION

1. Install elbow (12) in cold start valve (13).
2. Install bracket (22) with 2 screws (24) and nuts (23).
3. Position cold start valve (13) and bracket (17) and install 2 new self-locking screws (15) and nuts (14).
4. Pass control cable (1) through panel (27) and install nut (26).
5. Install control cable (1) in clamps (21 and 20) and tighten screws (19 and 18).
6. Install bracket (2) and 2 studs (6) on support with 2 new nuts (25), 4 new lockwashers (4), and 2 nuts (5).
7. Remove cap (16) from valve (13) and position cylinder (3) and bracket (7) on studs (6) and install 2 new lockwashers (8) and wingnuts (9).
8. Install injector (10) in intake manifold. Position tube (11) on injector and elbow (12) and tighten tube nuts.

4-28. ENGINE STARTING AID REPLACEMENT (Con't).



FOLLOW-ON TASKS:

- Close left door assembly.

TA505449

4-29. ENGINE STOP CABLE REPLACEMENT.

This Task Covers:

a. Removal b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

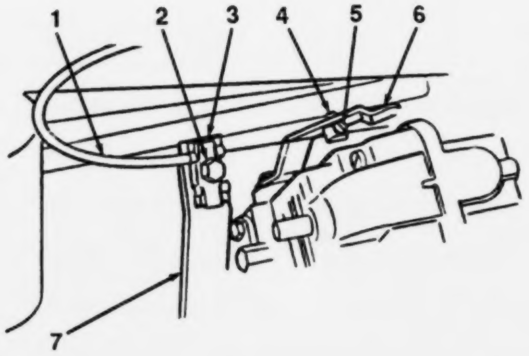
- One lockwasher

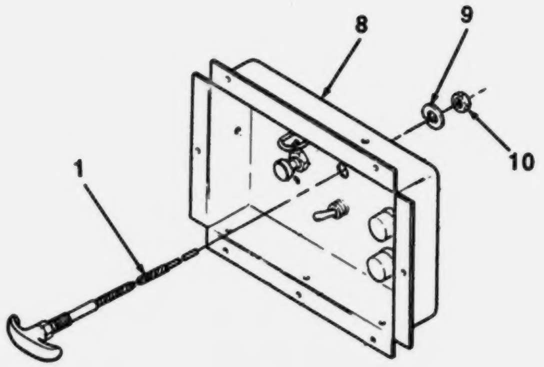
a. REMOVAL

1. Loosen capscrew (2) and setscrew (5).
2. Remove engine stop cable (1) from clamp (3), cable bracket (7), and pin (4) on stop lever (6).
3. Remove nut (10) and lockwasher (9) from engine stop cable (1). Discard lockwasher.
4. Remove engine stop cable (1) through control panel (8).

b. INSTALLATION

1. Install engine stop cable (1) through control panel (8).
2. Install and tighten nut (10) and new lockwasher (9) on engine stop cable (1).
3. Install end of engine stop cable (1) in clamp (3) and pin (4).
4. Tighten capscrew (2) on clamp (3). Pull slack out of engine stop cable (1) and tighten setscrew (5) on pin (4).
5. Check operation of engine stop cable (1) before starting engine.





FOLLOW-ON TASKS:

- Close left door assembly.

TA505450

Section VII. EXHAUST SYSTEM MAINTENANCE

Paragraph Number	Title	Page Number
4-30	Protective Cap Assembly Replacement	4-55
4-31	Muffler and Pipe Replacement	4-56

4-30. PROTECTIVE CAP ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal
b. Installation

Initial Setup:

Equipment Conditions:

- Engine off and cold.
- Right door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- Four self-locking bolts
- Four self-locking nuts

Personnel Required: Two

a. REMOVAL

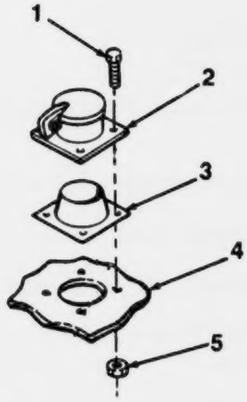
1. Remove 4 self-locking bolts (1) and nuts (5) from cap assembly (2). Discard self-locking bolts and nuts.
2. Remove cap assembly (2) and exhaust boot (3) from compressor unit roof assembly (4).

b. INSTALLATION

NOTE

Install cap assembly with hinge on front side of trailer.

1. Install exhaust boot (3) and cap assembly (2) on compressor unit roof assembly (4).
2. Line up holes in exhaust boot (3) and cap assembly (2). Install 4 new self-locking bolts (1) and nuts (5) in cap assembly.



TA505451

FOLLOW-ON TASKS:

- Close right door assembly.

4-31. MUFFLER AND PIPE REPLACEMENT.

This Task Covers:

a. Removal b. Installation

Initial Setup:

Equipment Conditions:

- Engine off and cold.
- Right door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- Two self-locking nuts
- Six lockwashers

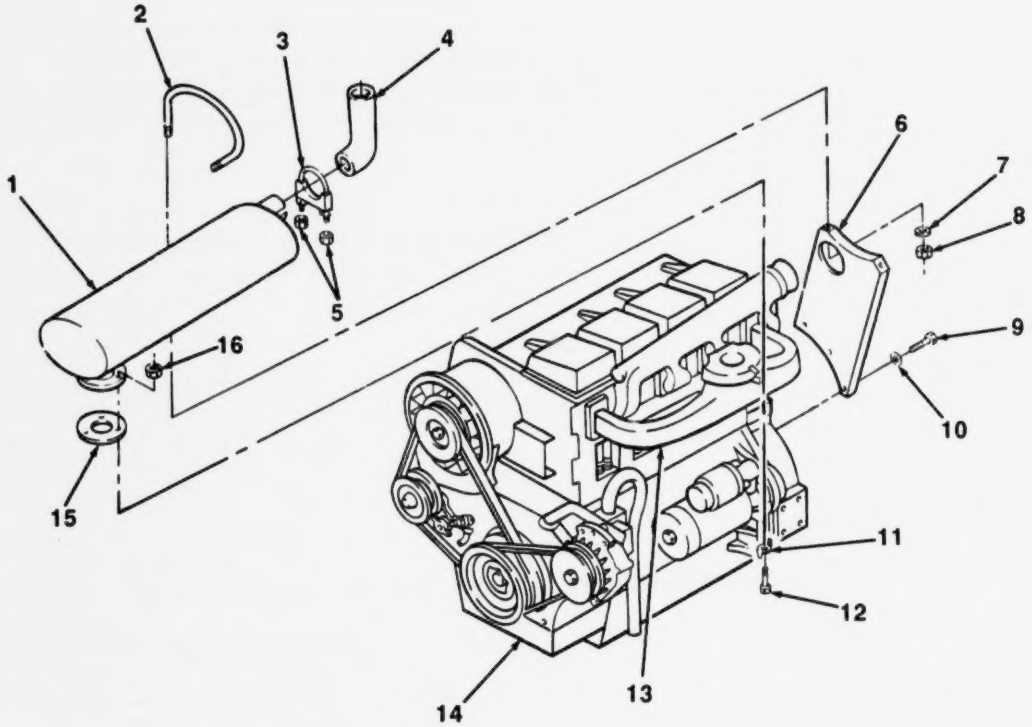
a. REMOVAL

1. Remove 2 self-locking nuts (8) and washers (7) from U-bolt (2). Discard self-locking nuts.
2. Remove 3 capscrews (12), lockwashers (11), and nuts (16). Discard lockwashers.
3. Remove muffler (1) and pipe (4) assembly from support bracket (6) and exhaust manifold (13). Remove U-bolt (2) from muffler.
4. Remove gasket (15) from muffler (1) and exhaust manifold (13).
5. Remove 4 nuts (5) from clamp (3). Remove clamp and pipe (4) from muffler (1).
6. Remove air intake hose from intake manifold (see paragraph 4-15).
7. Remove 3 capscrews (9) and lockwashers (10) from support bracket (6). Remove support bracket from engine (14). Discard lockwashers.

b. INSTALLATION

1. Install clamp (3) on outlet of muffler (1). Insert pipe (4) in outlet of muffler. Install 4 nuts (5) finger tight on clamp.
2. Install support bracket (6) on engine with 3 capscrews (9) and new lockwashers (10).
3. Install air intake hose (see paragraph 4-15).
4. Position gasket (15) on exhaust manifold (13).
5. Install U-bolt (2) on muffler (1). Install muffler and pipe (4) assembly on support bracket (6) and exhaust manifold (13).
6. Install 3 capscrews (12), new lockwashers (11) and nuts (16). Tighten nuts to 34 lb.-ft. (46.1 N•m).
7. Install U-bolt (2) on muffler (1) and support bracket (6) with 2 new self-locking nuts (8) and washers (7).

4-31. MUFFLER AND PIPE REPLACEMENT (Con't).



FOLLOW-ON TASKS:

- Close right door assembly.

TA505452

Section VIII. COOLING SYSTEM MAINTENANCE

Paragraph Number	Title	Page Number
4-32	Blower Assembly Fan Maintenance	4-59
4-33	Blower Assembly Fan Belt Replacement	4-62
4-34	Cowling, Duct, Guide Rail, Shield, and Plate Replacement	4-64
4-35	Idler Pulley Assembly Maintenance	4-67

4-32. BLOWER ASSEMBLY FAN MAINTENANCE.

This Tasks Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Blower assembly fan belt removed (see paragraph 4-33).
- Battery cables disconnected (see paragraph 4-57).

Materials/Parts:

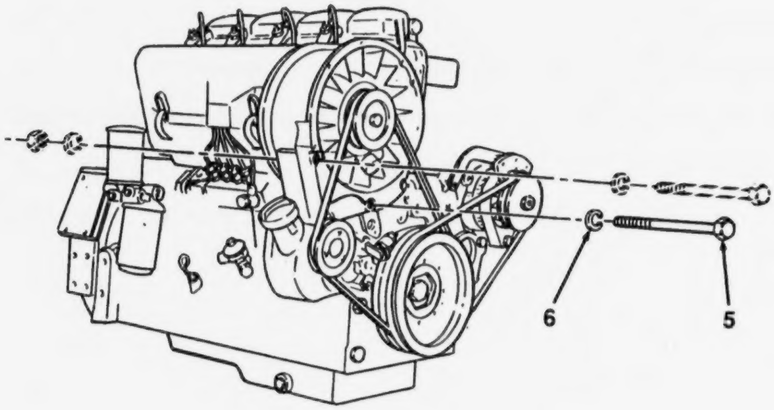
- Grease (Item 5, Appendix E)

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Remove 3 bolts (5) and washers (6).



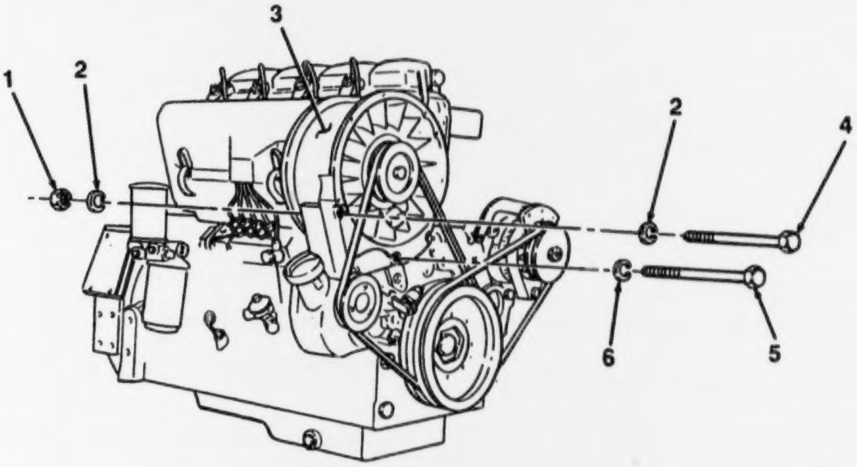
TA505453

4-32. BLOWER ASSEMBLY FAN MAINTENANCE (Con't).

2. Remove bolt (4), nut (1), and 2 washers (2). Remove blower assembly (3).

b. DISASSEMBLY

1. Remove bolt (15), nut (7), and pulley (14) from blower assembly (3).
2. Remove bottom roller (8) from blower assembly (3).
3. Remove spring tension clip (13), shaft (11), outer bearing (12), sleeve bushing (10), and inner bearing (9) from blower assembly (3).

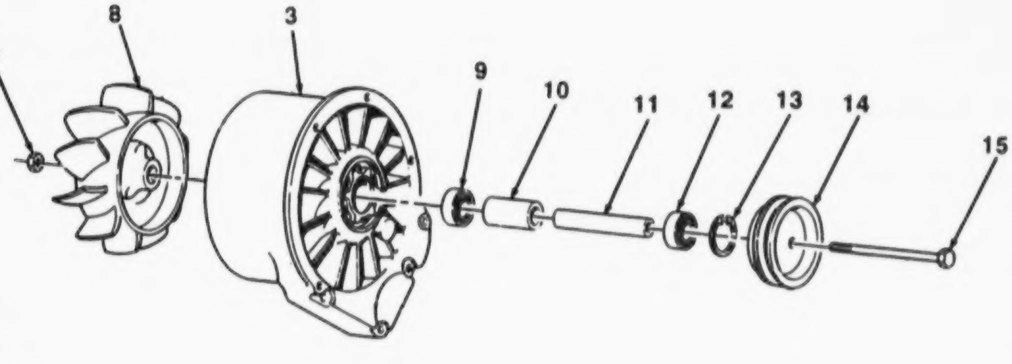


c. ASSEMBLY

1. Install inner bearing (9) with closed side facing away in blower assembly (3).
2. Install sleeve bushing (10) and shaft (11).
3. Fill bore in blower assembly (3) approximately ½-full with grease.
4. Install outer bearing (12) on shaft (11) in blower assembly (3) with open side of outer bearing facing in.
5. Install spring tension clip (13) in blower assembly (3).
6. Position bottom roller (8) and pulley (14) in place on ends of shaft (11). Install bolt (15) and nut (7).

TA505454

4-32. BLOWER ASSEMBLY FAN MAINTENANCE (Con't).



d. INSTALLATION

1. Position blower assembly (3) in place and install 3 bolts (5) and washers (6).
2. Install bolt (4) with 2 washers (2) and nut (1).

FOLLOW-ON TASKS:

- Install blower assembly fan belt (see paragraph 4-33).
- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505455

4-33. BLOWER ASSEMBLY FAN BELT REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left and right door assemblies opened.
- Battery cables disconnected (see paragraph 4-57).
- Alternator belt removed (see paragraph 4-37).

Materials/Parts:

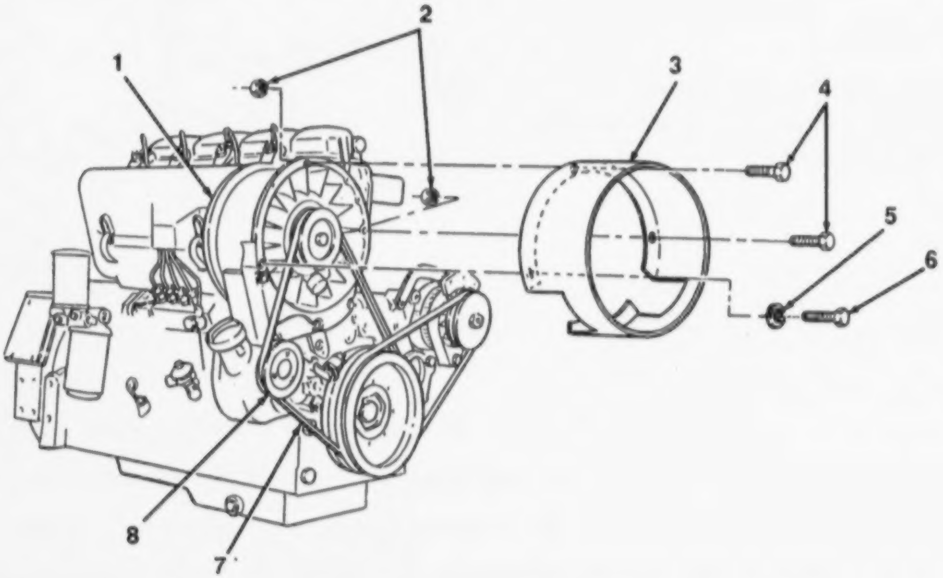
- Twenty-two self-locking nuts

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Remove screw (6), washer (5), 2 capscrews (4), and self-locking nuts (2) from air intake connector (3). Discard self-locking nuts.
2. Remove air intake connector (3) from blower assembly (1).
3. Lift idler pulley (8) and remove fan belt (7).



b. INSTALLATION

1. Lift idler pulley (8) and install fan belt (7).
2. Position air intake connector (3) in place on blower assembly (1).
3. Install screw (6), washer (5), capscrews (4), and 2 new self-locking nuts (2).

TA505456

4-33. BLOWER ASSEMBLY FAN BELT REPLACEMENT (Con't).

FOLLOW-ON TASKS:

- Install alternator belt (see paragraph 4-37).
- Connect battery cables (see paragraph 4-57).
- Close left and right door assemblies.

4-34. COWLING, DUCT, GUIDE RAIL, SHIELD, AND PLATE REPLACEMENT.

This Task Covers:

a. Removal
b. Cleaning
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Battery cables disconnected (see paragraph 4-57).
- Blower assembly removed (see paragraph 4-32).
- Fuel lines removed (see paragraph 4-24).

Tools/Test Equipment:

- General mechanic's tool kit
- Face mask
- Soft bristle brush

Materials/Parts:

- Twenty-two lockwashers

Personnel Required: Two

General Safety Instructions:

- Compressed air used for drying or cleaning purposes must not exceed 30 psi (207 kPa).

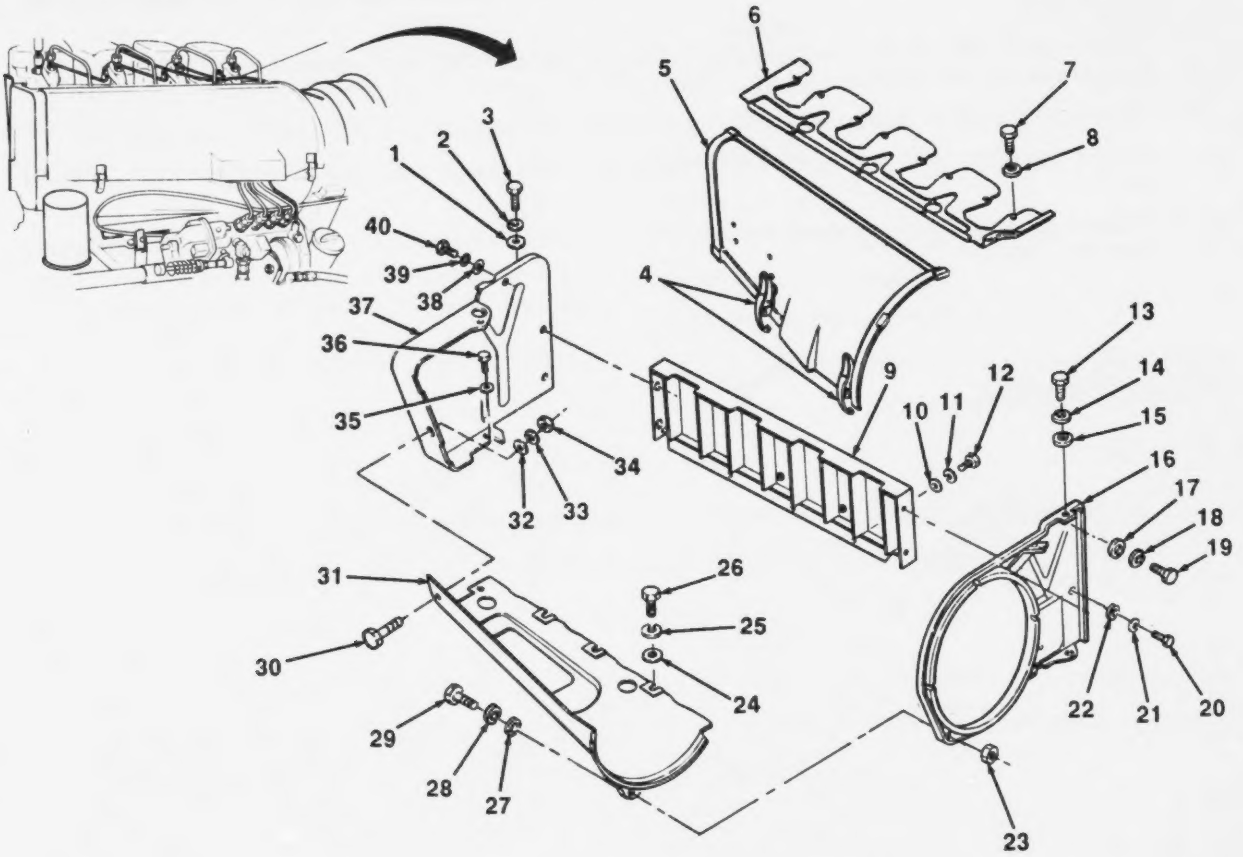
a. REMOVAL

1. Open 2 fasteners (4) and remove duct (5) from guide rail (6).
2. Remove 8 bolts (7) and lockwashers (8) from guide rail (6). Remove guide rail. Discard lockwashers.
3. Remove 4 bolts (20), lockwashers (21), and flatwashers (22) from stay plate (37), plate (16), and shield (9). Discard lockwashers.
4. Remove 3 bolts (12), lockwashers (11), and flatwashers (10) from shield (9). Remove shield. Discard lockwashers.
5. Remove 3 bolts (13, 19, and 29), lockwashers (14, 18, and 28), flatwashers (15, 17, and 27), and nut (23) from plate (16). Remove plate. Discard lockwashers.
6. Remove 2 bolts (30 and 40), lockwashers (32 and 39), flatwashers (33 and 38), and nut (34) from stay plate (37). Discard lockwashers.
7. Remove bolt (3), lockwasher (2), washer (1), from stay plate (37). Discard lockwasher.
8. Remove bolt (36) and washer (35) from stay plate (37).
9. Remove bolt (26), lockwasher (25), and flatwasher (24) from base cowling (31) and stay plate (37). Remove stay plate. Discard lockwasher.
10. Remove oil cooler (see paragraph 4-17).
11. Remove base cowling (31).

b. CLEANING

1. Loosen dust and debris on duct (5), guide rail (6), shield (9), plate (16), base cowling (31), and stay plate (37) with brush.

4-34. COWLING, DUCT, GUIDE RAIL, SHIELD, AND PLATE REPLACEMENT (Con't).



WARNING

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.

2. Using compressed air and brush, clear dust and debris from parts.

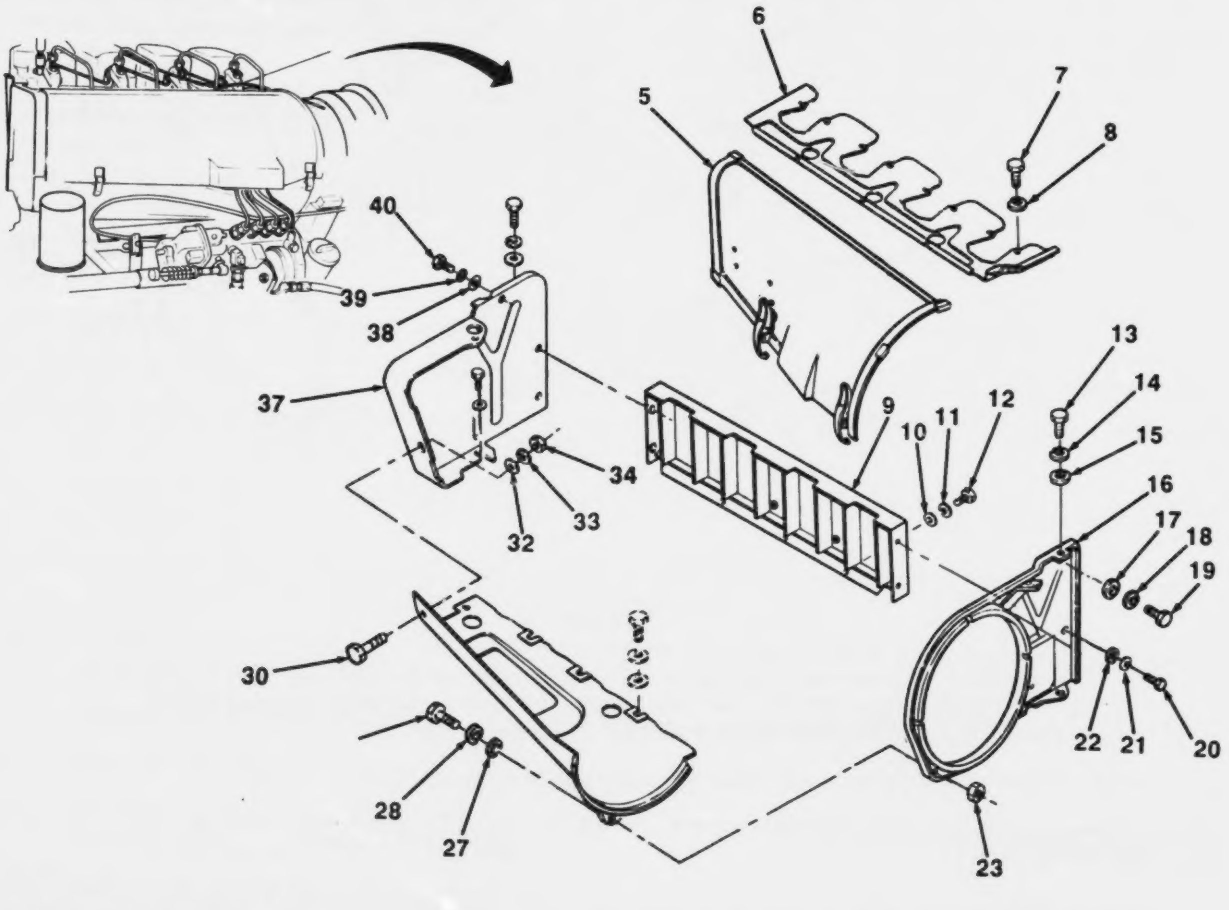
c. INSTALLATION

1. Position base cowling (31) in place and install bolt (26), new lockwasher (25), and flatwasher (24).
2. Install oil cooler (see paragraph 4-17).
3. Position stay plate (37) in place and install bolt (36) and washer (35).
4. Install bolt (3), new lockwasher (2), and flatwasher (1).

TA505457

4-34. COWLING, DUCT, GUIDE RAIL, SHIELD, AND PLATE REPLACEMENT (Con't).

5. Install 2 bolts (30 and 40), new lockwashers (32 and 39), flatwashers (33 and 38), and nut (34) in stay plate (37).
6. Position plate (16) in place and install 3 bolts (13, 19, and 29), new lockwashers (14, 18, and 28), flatwashers (15, 17, and 27), and nut (23).
7. Position shield (9) in place and install 3 bolts (12), new lockwashers (11), and flatwashers (10).
8. Install 4 bolts (20), new lockwashers (21), and flatwashers (22) in stay plate (37), plate (16), and shield (9).
9. Position guide rail (6) in place and install 8 bolts (7), and new lockwashers (8). Install duct (5) and close fasteners (4).



FOLLOW-ON TASKS:

- Install fuel lines (see paragraph 4-24).
- Install blower assembly (see paragraph 4-32).
- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505458

4-35. IDLER PULLEY ASSEMBLY MAINTENANCE.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Belt break switch removed (see paragraph 4-42).
- Blower assembly fan belt removed (see paragraph 4-33).
- Battery cables disconnected (see paragraph 4-57).

Materials/Parts:

- One gasket
- One preformed packing

Tools/Test Equipment:

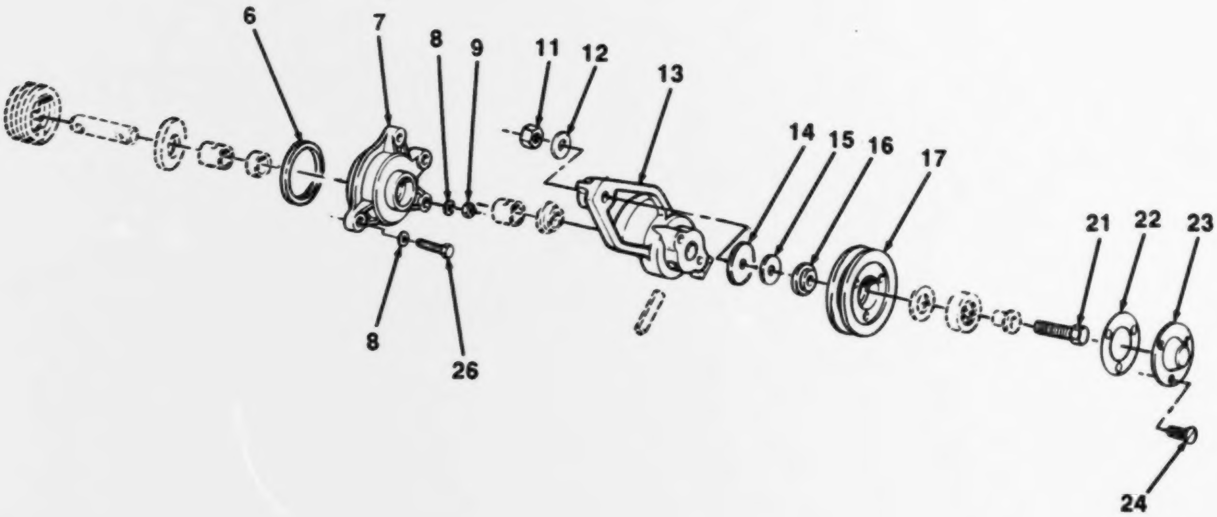
- General mechanic's tool kit
- Arbor press
- Puller kit

a. REMOVAL

1. Remove nut (9), bolt (26), 2 washers (8), idler pulley assembly, and cover (7) from engine.
2. Remove preformed packing (6) from cover (7). Discard preformed packing.

b. DISASSEMBLY

1. Remove 3 countersunk screws (24), cover (23), and gasket (22) from V-belt pulley (17). Discard gasket.
2. Remove bolt (21), washers (12, 14, and 15), V-belt pulley (17), and nut (11) from pulley lever (13).
3. Remove ring (16) from V-belt pulley (17).



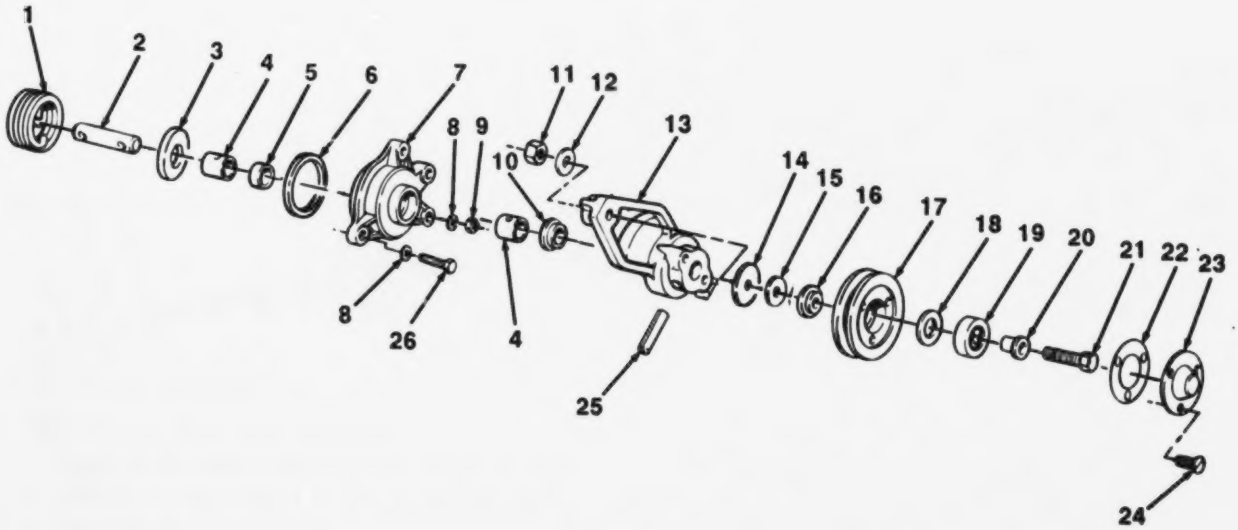
TA505459

4-35. IDLER PULLEY ASSEMBLY MAINTENANCE (Con't).

4. Drive bushing (20) out from opposite side of V-belt pulley (17).
5. Using puller, remove bearing (19) and washer (18) from V-belt pulley (17).
6. Remove roll pin (25) from pulley lever (13).
7. Slide spring (1) and shaft (2) out of cover (7).
8. Remove shaft seal (10) from cover (7).
9. Using arbor press, drive 2 bearing bushings (4), spacer (5), and washer (3) from cover (7).
10. Disconnect shaft (2) from spring (1).

c. ASSEMBLY

1. Using arbor press, install 2 bearing bushings (4) and spacer (5) in cover (7).
2. Connect shaft (2) and spring (1). Install washer (3) on shaft with cupped side facing away from spring.
3. Install spring (1), shaft (2), and washer (3) in cover (7).
4. Install shaft seal (10) in cover (7).
5. Install cover (7), spring (1), and shaft (2) in place on pulley lever (13). Line up holes in shaft and pulley lever and install roll pin (25).
6. Install washer (18) and bearing (19) in V-belt pulley (17).
7. Install bushing (20) in V-belt pulley (17).
8. Install ring (16) in V-belt pulley (17).
9. Install V-belt pulley (17), washers (12, 14, and 15), nut (11), and bolt (21) on pulley lever (13).
10. Install new gasket (22) and cover (23) on V-belt pulley (17) with 3 countersunk screws (24).



TA505460

4-35. IDLER PULLEY ASSEMBLY MAINTENANCE (Con't).

d. INSTALLATION

1. Install new preformed packing (6) on cover (7).
2. Position idler pulley assembly and cover (7) in place on engine and install nut (9), bolt (26), and 2 washers (8).

FOLLOW-ON TASKS:

- Install blower assembly fan belt (see paragraph 4-33).
- Install belt break switch (see paragraph 4-42).
- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

Section IX. ELECTRICAL SYSTEM MAINTENANCE

Paragraph Number	Title	Page Number
4-36	Alternator Replacement	4-72
4-37	Alternator Belt Replacement	4-77
4-38	Voltage Regulator Replacement	4-79
4-39	Starter Motor Replacement	4-80
4-40	Fuse Replacement	4-82
4-41	Oil Pressure Switch Replacement	4-83
4-42	Belt Break Switch Replacement	4-85
4-43	Oil Temperature Switch Replacement	4-86
4-44	Fuel Tank Transmitter Replacement	4-88
4-45	Light Switch Replacement	4-89
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4-36. ALTERNATOR REPLACEMENT.

This Task Covers:

a. Test
b. Removal
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Right door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit
- Multimeter

Materials/Parts:

- One locknut
- Six lockwashers

General Safety Instructions:

- Remove all jewelry.

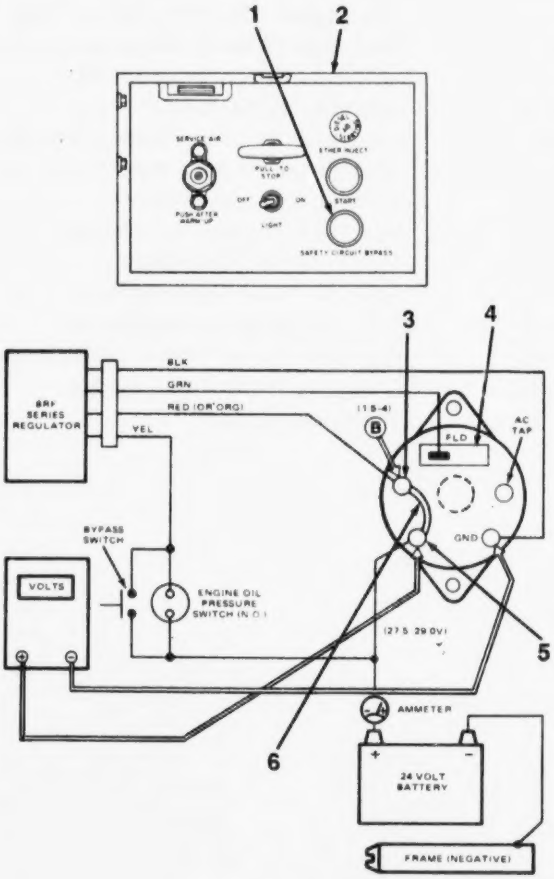
a. TEST

FIELD DIODE TEST (OPEN)

WARNING

Remove all jewelry when working on alternator. Do not bridge alternator studs with metal. Improper contact may cause severe burns.

1. Depress SAFETY CIRCUIT BYPASS button (1) on control panel (2).
2. Using multimeter, check for 27.5-29 volts at voltage regulator terminal (3) and for 1.5-4 volts at positive output terminal (5).
3. Install test jumper JU1 (6) between voltage regulator terminal (3) and positive output terminal (5).
4. Using multimeter, check voltage at voltage regulator terminal (3). If charging voltage is present, the field diode (4) is "open" and defective. Replace alternator.

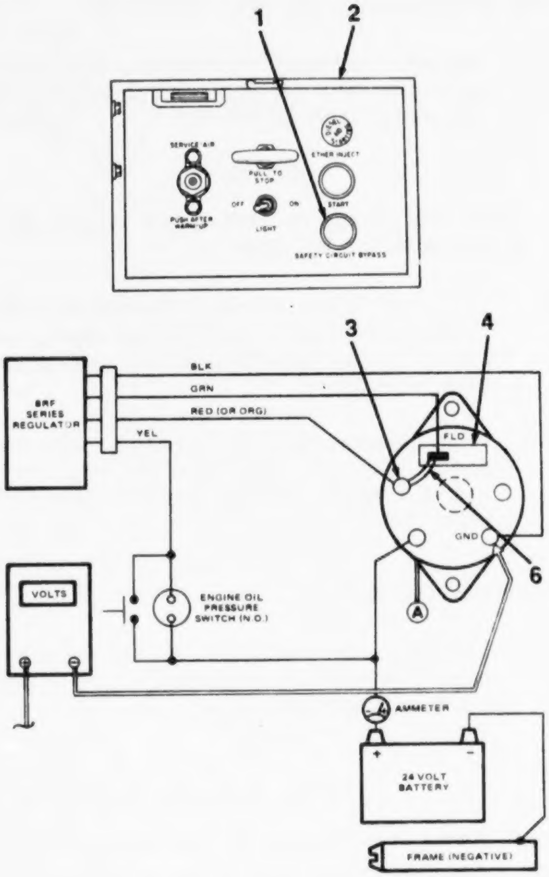


TA505461

4-36. ALTERNATOR REPLACEMENT (Con't).

VOLTAGE REGULATOR TEST (OPEN)

1. Check for 27.5-29 volts at voltage regulator terminal (3) and positive output terminal (5).
2. Install test jumper JU1 (6) between voltage regulator terminal (3) and field diode (4).
3. Depress SAFETY CIRCUIT BYPASS button (1) on control panel (2) and check voltage at voltage regulator terminal (3).
4. If 1.5-4 volts are present, voltage regulator is "open" and defective. Replace voltage regulator (see paragraph 4-38).
5. If no voltage is present, an open field circuit exists, indicating a defective alternator. Replace alternator.



TA505462

4-36. ALTERNATOR REPLACEMENT (Con't).

VOLTAGE REGULATOR TEST (SHORTED)

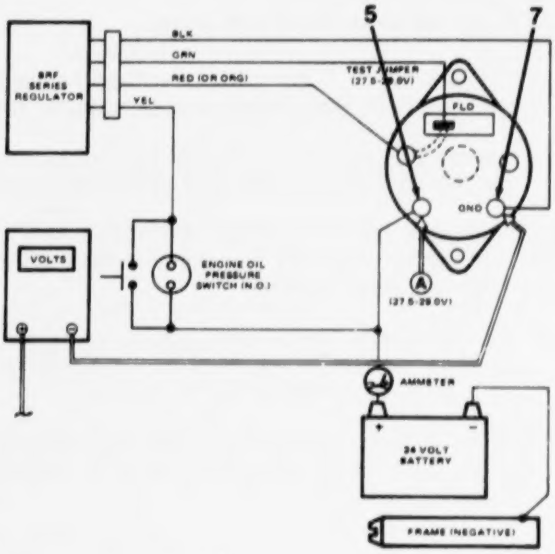
1. Connect multimeter negative lead to alternator ground terminal (7) and positive lead to positive output terminal (5).

NOTE

When the engine is running, the engine oil pressure switch is closed.

2. Start and idle engine with no electrical loads at 1400 rpm until multimeter voltage reading stabilizes at the regulator high end setting (see paragraph 2-12).

3. Check voltage reading. If voltage reading exceeds 30 volts, the voltage regulator is shorted. Replace voltage regulator (see paragraph 4-38).



ALTERNATOR OUTPUT TEST

1. Connect multimeter negative lead to alternator ground terminal (7) and positive lead to positive output terminal (5).

NOTE

When engine is running, the engine oil pressure switch is closed.

2. Start and idle engine at 1400 rpm (see paragraph 2-12).

NOTE

Voltage reading may vary a few tenths of a volt, higher or lower, due to ambient temperature variations.

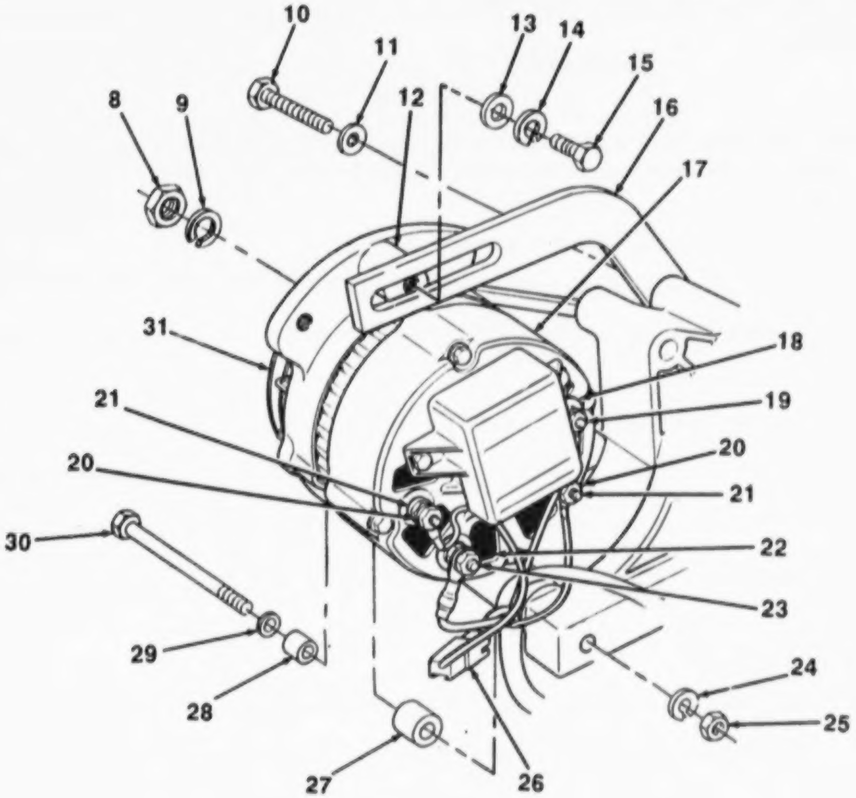
3. Check multimeter for nominal system output voltage reading between 27.5–29 volts.
4. If the output voltage reading is not within the proper range, replace alternator.

b. REMOVAL

1. Remove alternator belt (see paragraph 4-37).
2. Disconnect wire at connector (26).
3. Remove 2 nuts (21) and lockwashers (20) from terminals and remove 3 wire leads. Discard lockwashers.
4. Remove nut (23) and lockwasher (22) from terminal and remove 2 wire leads. Discard lockwasher.
5. Remove locknut (19) and washer (18) from terminal and remove wire lead. Discard locknut.

TA505463

4-36. ALTERNATOR REPLACEMENT (Con't).



6. Remove bolt (15), lockwasher (14), flatwasher (13), and spacer (12) from alternator (17) and alternator bracket (16). Discard lockwasher.
7. Remove capscrew (30), flatwasher (29), sleeve bushing (28), spacer (27), lockwasher (24), and nut (25) from alternator (17). Discard lockwasher.
8. Remove alternator (17).
9. Remove nut (8) and lockwasher (9). Discard lockwasher.
10. Pry pulley (31) from alternator (17).
11. Remove screw (10), washer (11), and alternator bracket (16).

c. INSTALLATION

1. Position alternator bracket (16) in place and install screw (10) and washer (11).
2. Position pulley (31) on alternator (17) shaft and install new lockwasher (9) and nut (8).
3. Position alternator (17) in place and install capscrew (30), flatwasher (29), sleeve bushing (28), spacer (27), new lockwasher (24), and nut (25).

TA505464

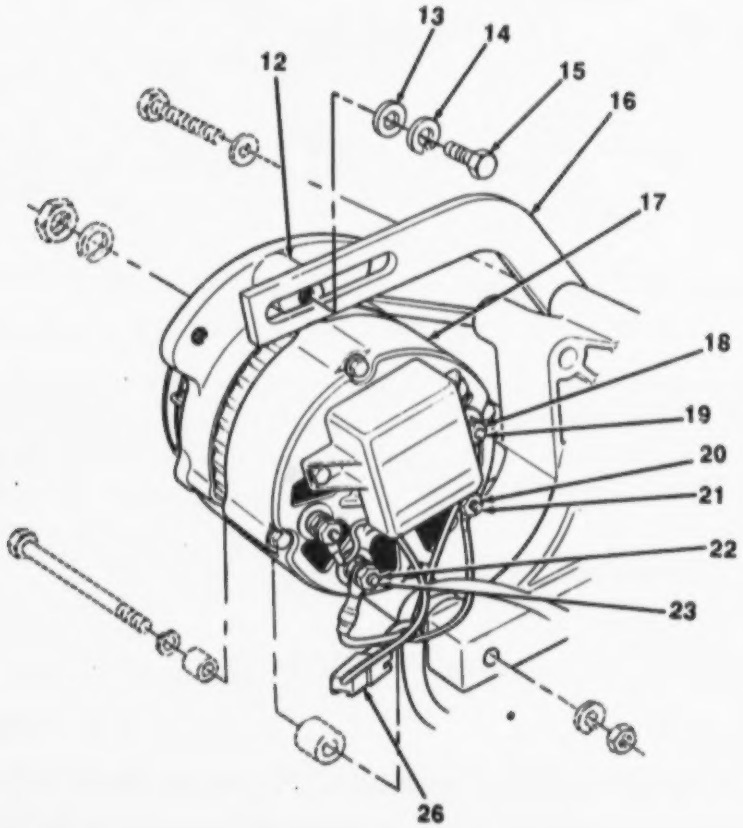
4-36. ALTERNATOR REPLACEMENT (Con't).

4. Install bolt (15), new lockwasher (14), flatwasher (13), and spacer (12) in alternator bracket (16) and alternator (17).

CAUTION

Ensure that wires are installed on the correct alternator terminals. Severe electrical damage to alternator and wires can result if wires are installed on the wrong terminal.

5. Install washer (18) and wire lead with new locknut (19).
6. Install 2 wire leads with new lockwasher (22) and nut (23).
7. Install 3 wire leads with 2 new lockwashers (20) and nuts (21).
8. Connect connector (26).
9. Install alternator belt and adjust (see paragraph 4-37).



FOLLOW-ON TASKS:

- Close right door assembly.

TA505465

4-37. ALTERNATOR BELT REPLACEMENT.

This Task Covers:

a. Removal
b. Installation
c. Adjustment

Initial Setup:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).
- Right door assembly open.

Materials/Parts:

- Alternator belt

Tools/Test Equipment:

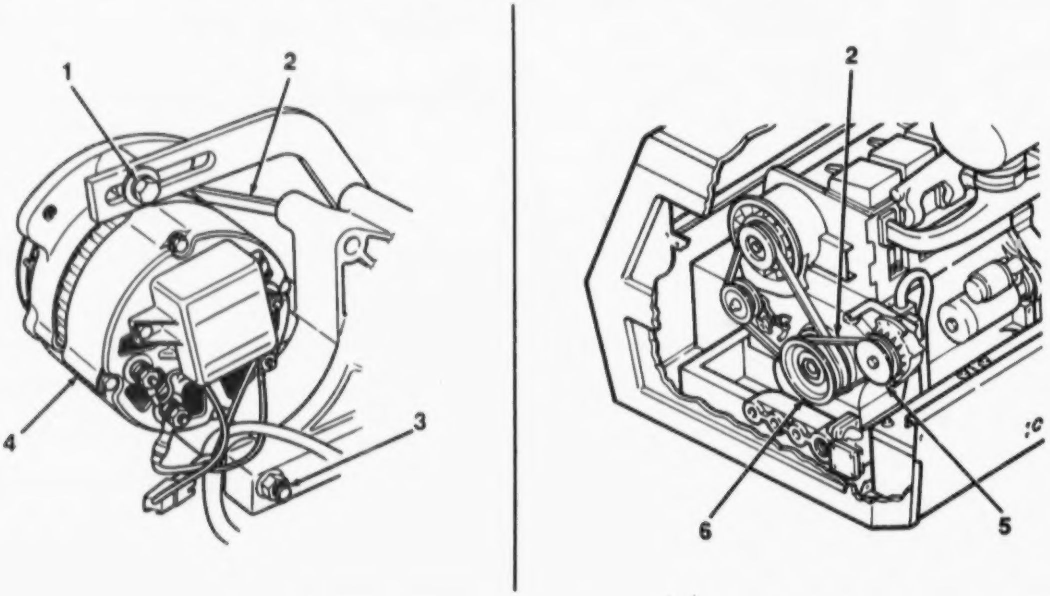
- General mechanic's tool kit

a. REMOVAL

1. Loosen bolt (1) and nut (3).
2. Push on alternator (4) and rotate toward engine until alternator belt (2) is loose.
3. Remove alternator belt (2) from alternator pulley (5) and crankshaft pulley (6). Discard alternator belt.

b. INSTALLATION

1. Install new alternator belt (2) in place on crankshaft pulley (6) and alternator pulley (5).
2. Pull on alternator (4) and rotate away from engine until alternator belt (2) is tight.

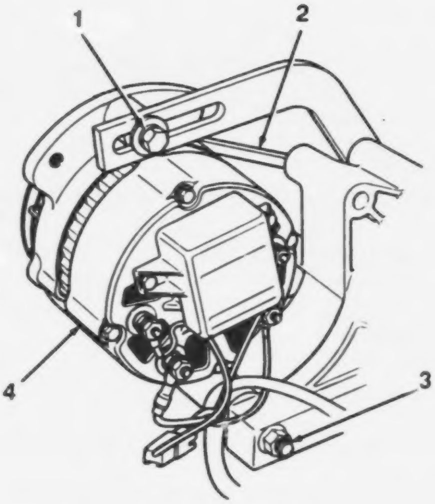


TA505466

4-37. ALTERNATOR BELT REPLACEMENT (Con't).

c. ADJUSTMENT

1. Press down on alternator belt (2) with your thumb and adjust position of alternator (4) until alternator belt deflects no more than 0.4-0.6 in. (10-15 mm).
2. Tighten bolt (1) and nut (3).



FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close rignt door assembly.

TA505467

4-38. VOLTAGE REGULATOR REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).
- Right door assembly open.

Materials/Parts:

- One locknut
- One lockwasher

Tools/Test Equipment:

- General mechanic's tool kit

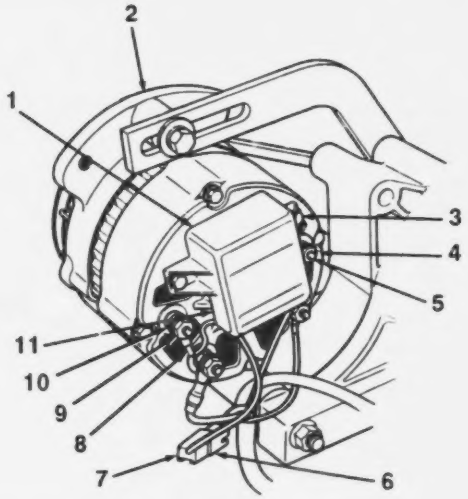
a. REMOVAL

1. Disconnect electrical connectors (6 and 7).
2. Remove nut (9) and lockwasher (10) and remove wire lead (8) from terminal. Discard lockwasher.
3. Remove locknut (4) and wire lead (5). Discard locknut.
4. Remove 3 capscrews (3) and lift voltage regulator (1) from alternator (2) to gain access to wire lead (11).

NOTE

Fourth wire lead is hidden under voltage regulator.

5. Disconnect wire lead (11) from alternator (2) and remove voltage regulator (1).



b. INSTALLATION

1. Connect wire lead (11) to alternator (2).
2. Position voltage regulator (1) in place on alternator (2).
3. Install 3 capscrews (3) in voltage regulator (1) and alternator (2).
4. Install wire lead (5) with new locknut (4).
5. Install wire lead (8) with new lockwasher (10) and nut (9).
6. Connect electrical connectors (6 and 7).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close right door assembly.

TA505468

4-39. STARTER MOTOR REPLACEMENT.

This Task Covers:

a. Removal b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).
- Right door assembly open.

Materials/Parts:

- Five lockwashers

Tools/Test Equipment:

- General mechanic's tool kit

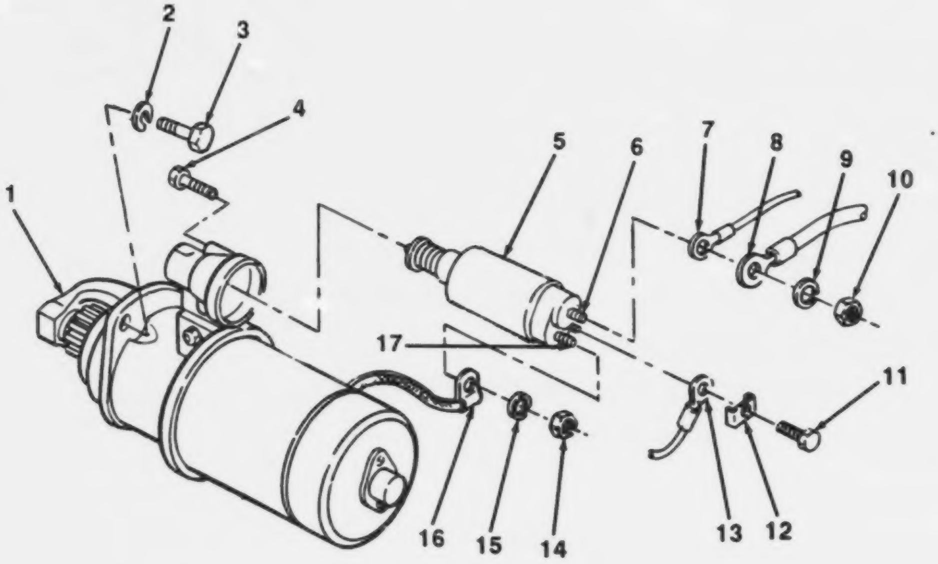
a. REMOVAL

1. Remove nut (10), lockwasher (9), battery cable (8), and electrical lead (7) from solenoid terminal (6). Discard lockwasher.
2. Remove capscrew (11), clamp (12), and electrical lead (13) from solenoid (5).
3. Remove nut (14), lockwasher (15), and ground strap (16) from solenoid terminal (17). Discard lockwasher.
4. Remove 3 bolts (3) and lockwashers (2), and remove starter (1) from flywheel housing. Discard lockwashers.

NOTE

If solenoid is damaged or defective, perform step 5.

5. Remove 3 screws (4) and remove solenoid (5) from starter (1).



TA505469

4-39. STARTER MOTOR REPLACEMENT (Con't).

b. INSTALLATION

NOTE

If solenoid was removed, perform step 1. If not, go to step 2.

1. Position solenoid (5) in place on starter (1). Install 3 screws (4) in solenoid (5) and starter (1).
2. Position starter (1) in opening of flywheel housing and install 3 new lockwashers (2) and bolts (3).
3. Install ground strap (16), new lockwasher (15), and nut (14) on solenoid terminal (17).
4. Install capscrew (11), clamp (12), and electrical lead (13) on solenoid (5).
5. Install electrical lead (7), battery cable (8), new lockwasher (9), and nut (10) on solenoid terminal (6).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close right door assembly.
- Start engine and check starter operation (see paragraph 2-12).

4-40. FUSE REPLACEMENT.

This Task Covers:

a. Removal
b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.

Materials/Parts:

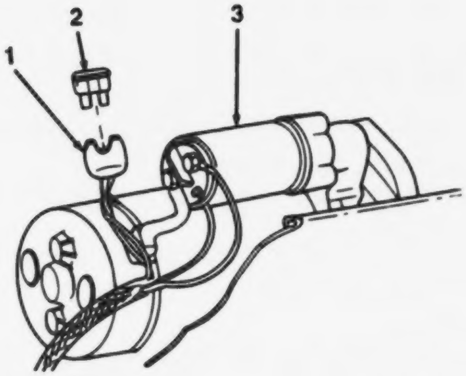
- 20 amp fuse

a. REMOVAL

1. Locate fuseholder (1) on wiring harness attached to starter solenoid (3).
2. Remove 20 amp fuse (2) from fuseholder (1). Discard 20 amp fuse.

b. INSTALLATION

1. Install new 20 amp fuse (2) in fuseholder (1).



FOLLOW-ON TASKS:

- Close left door assembly.

TA505470

4-41. OIL PRESSURE SWITCH REPLACEMENT.

This Task Covers:

a. Removal
b. Inspection
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).
- Left door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit
- Multimeter

a. REMOVAL

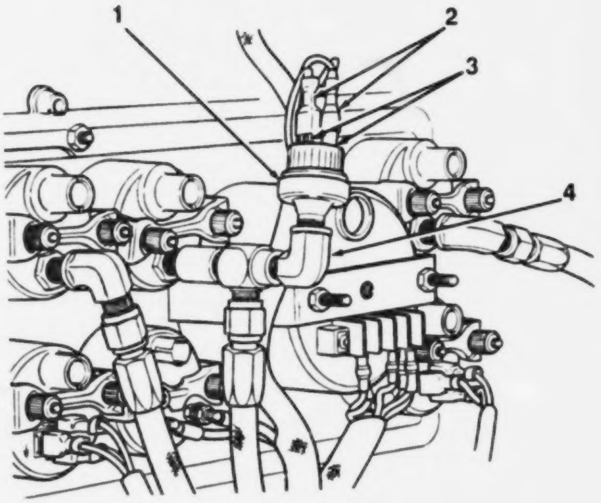
NOTE

Identify and tag electrical leads before removal.

1. Disconnect 2 electrical leads (2) from oil pressure switch terminals (3).
2. Unscrew and remove oil pressure switch (1) from elbow (4).

b. INSPECTION

1. Connect oil pressure switch (1) to a controlled pressure source. Connect multimeter terminal leads to oil pressure switch terminals (3).
2. Apply pressure slowly from controlled source to oil pressure switch (1) while monitoring multimeter. Oil pressure switch should close at 12 psi (83 kPa) and indicate continuity on multimeter.
3. Decrease pressure slowly. Oil pressure switch (1) should open at 8 psi (55 kPa) and multimeter should indicate no continuity (infinite ohms).
4. If oil pressure switch (1) does not close or open as indicated, replace oil pressure switch.



c. INSTALLATION

1. Install oil pressure switch (1) in elbow (4).
2. Connect 2 electrical leads (2) to oil pressure switch terminals (3).

TA505471

4-41. OIL PRESSURE SWITCH REPLACEMENT (Con't).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

4-42. BELT BREAK SWITCH REPLACEMENT.

This Task Covers:

a. Inspection
b. Removal
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).
- Left and right door assemblies open.

Tools/Test Equipment:

- General mechanic's tool kit
- Multimeter

a. INSPECTION

1. Remove 2 wire leads (4) from belt break switch (3).
2. Using multimeter, test continuity and function of belt break switch (3).

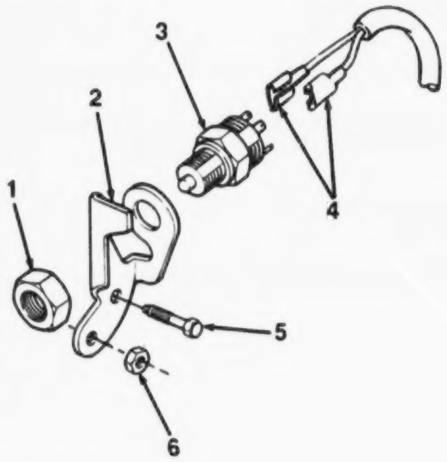
b. REMOVAL

1. Remove nut (1) and belt break switch (3) from retainer (2).

NOTE

If retainer is damaged or must be removed for access, perform step 2.

2. Remove bolt (5), nut (6), and retainer (2) from engine.



c. INSTALLATION

NOTE

If retainer was removed, perform step 1. If not, go to step 2.

1. Position retainer (2) in place on engine and install nut (6) and bolt (5).
2. Position belt break switch (3) through hole in retainer (2). Install nut (1) on belt break switch.
3. Install 2 wire leads (4) on belt break switch (3).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left and right door assemblies.

TA505472

4-43. OIL TEMPERATURE SWITCH REPLACEMENT.

This Task Covers:

a. Removal
b. Inspection
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Battery cables disconnected (see paragraph 4-57).
- Compressor oil tank drained (see LO 5-4310-452-12).

Materials/Parts:

- One preformed packing

Tools/Test Equipment:

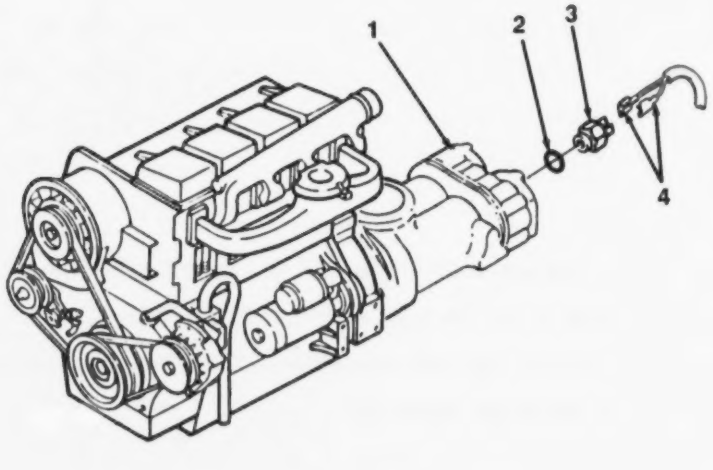
- General mechanic's tool kit
- Multimeter

a. REMOVAL

1. Remove 2 wire leads (4) from oil temperature switch (3).
2. Unscrew and remove oil temperature switch (3) and preformed packing (2) from compressor (1). Discard preformed packing.

b. INSPECTION

1. Using multimeter, test continuity and function of oil temperature switch (3).



TA505473

4-43. OIL TEMPERATURE SWITCH REPLACEMENT (Con't).

c. INSTALLATION

1. Install new preformed packing (2) and oil temperature switch (3) in compressor (1).
2. Install 2 wire leads (4) on oil temperature switch (3).

FOLLOW-ON TASKS:

- Fill compressor oil tank (see LO 5-4310-452-12).
- Connect battery cables (see paragraph 4-57).
- Close left and right door assemblies.

4-44. FUEL TANK TRANSMITTER REPLACEMENT.

This Task Covers:

a. Inspection
b. Removal
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit
- Multimeter

Materials/Parts:

- One gasket

a. INSPECTION

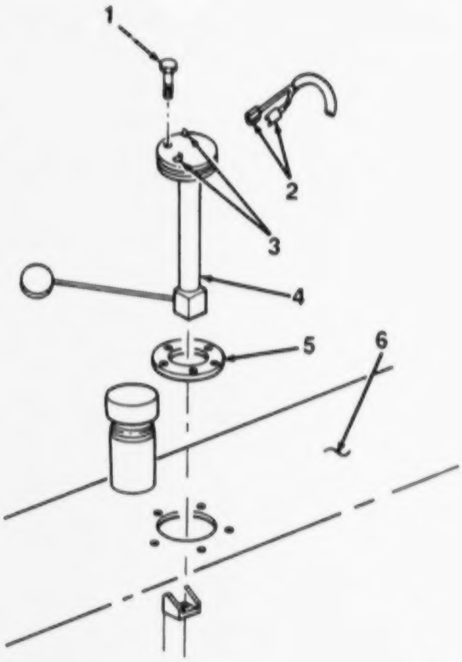
1. Remove 2 wire leads (2) from transmitter terminals (3). Visually inspect transmitter for cracks, bends, or broken transmitter terminals.
2. Using multimeter, test continuity and function of transmitter (4). Replace transmitter if damaged or defective.

b. REMOVAL

1. Remove 5 capscrews (1) from transmitter (4) and fuel tank (6).
2. Remove transmitter (4) and gasket (5) from fuel tank (6). Discard gasket (5).

c. INSTALLATION

1. Install new gasket (5) and transmitter (4) in place on fuel tank (6).
2. Install 5 capscrews (1) in transmitter (4) and fuel tank (6).
3. Connect 2 wire leads (2) to transmitter terminals (3).



FOLLOW-ON TASKS:

- Close left door assembly.

TA505474

4-45. LIGHT SWITCH REPLACEMENT.

This Task Covers:

a. Inspection
b. Removal
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).
- Left door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit
- Multimeter

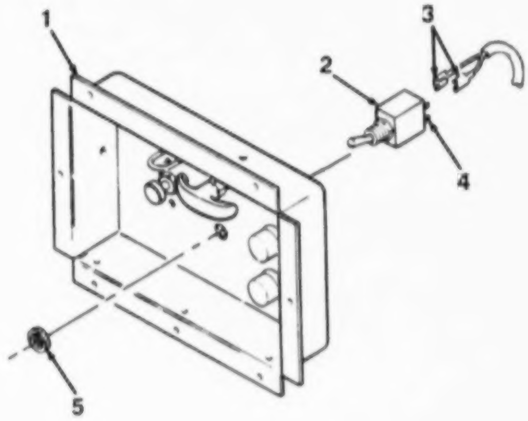
a. INSPECTION

1. Remove 2 electrical leads (3) from switch terminals (4). Visually inspect switch (2) for damaged or broken switch terminals.

2. Using multimeter, test switch (2) for continuity and function. Replace switch if damaged or defective.

b. REMOVAL

1. Unscrew nut (5) from switch (2). Remove switch from control panel (1).



c. INSTALLATION

1. Position switch (2) in place in control panel (1) and install nut (5).

2. Install 2 electrical leads (3) on switch terminals (4).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505475

4-46. START SWITCH REPLACEMENT.

Initial Setup:

a. Inspection
b. Removal
c. Installation

This Task Covers:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).
- Left door assembly open.

Tools/Test Equipment:

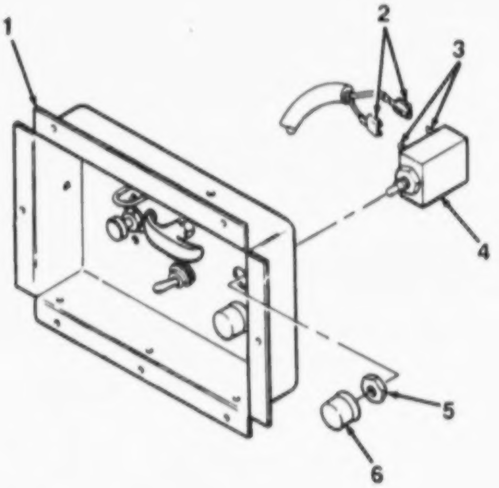
- General mechanic's tool kit
- Multimeter

a. INSPECTION

1. Remove 2 electrical leads (2) from switch terminals (3). Visually inspect switch (4) for damage or broken switch terminals.
2. Using multimeter, test switch (4) for continuity and function. Replace switch if damaged or defective.

b. REMOVAL

1. Remove boot (6) and nut (5) from switch (4). Remove switch from control panel (1).



c. INSTALLATION

1. Position switch (4) in place in control panel (1). Install nut (5) and boot (6) on switch.
2. Install 2 electrical leads (2) on switch terminals (3).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505476

4-47. SAFETY CIRCUIT BYPASS SWITCH REPLACEMENT.

This Task Covers:

a. Inspection
b. Removal
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).
- Left door assembly open.

Tools/Test Equipment:

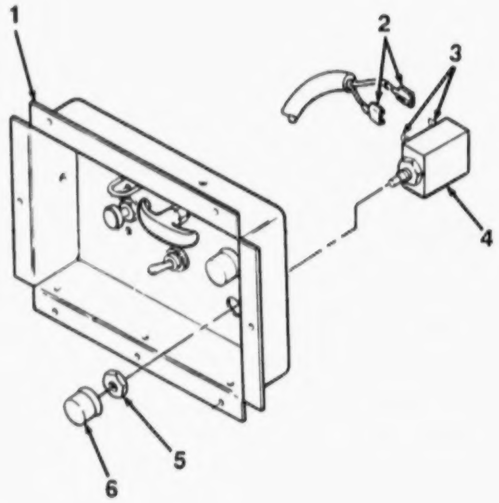
- General mechanic's tool kit
- Multimeter

a. INSPECTION

1. Remove 2 electrical leads (2) from switch terminals (3). Visually inspect switch (4) for damage or broken switch terminals.
2. Using multimeter, test switch (4) for continuity and function. Replace switch if damaged or defective.

b. REMOVAL

1. Remove boot (6) and nut (5) from switch (4). Remove switch from control panel (1).



c. INSTALLATION

1. Position switch (4) in place in control panel (1). Install nut (5) and boot (6) on switch.
2. Install 2 electrical leads (2) on switch terminals (3).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505477

4-48. SERVICE-AIR VALVE REPLACEMENT.

This Task Covers:

a. Inspection
b. Removal
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Battery cables disconnected (see paragraph 4-57).
- Air lines and fittings removed (see paragraph 4-72).

Tools/Test Equipment:

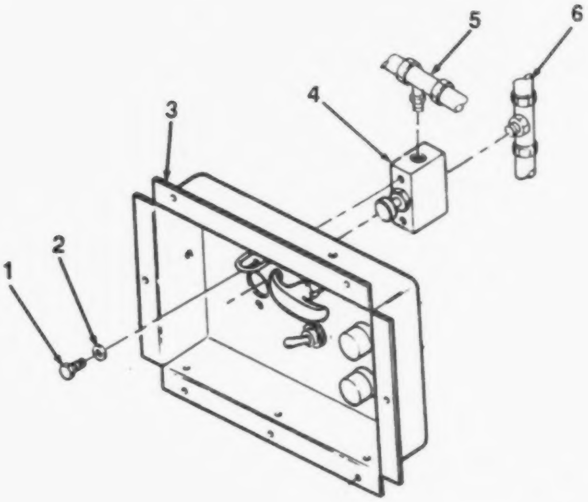
- General mechanic's tool kit

a. INSPECTION

1. Inspect tube tees (5 and 6) on service-air valve (4) for damage.
2. Inspect service-air valve (4) for damage. Replace service-air valve if defective.

b. REMOVAL

1. Remove 2 capscrews (1) and washers (2) from control panel (3). Remove service-air valve (4) from control panel.
2. Remove tube tees (5 and 6) from service-air valve (4).



c. INSTALLATION

1. Install tube tees (5 and 6) in service-air valve (4).
2. Position service-air valve (4) in place in control panel (3). Install 2 capscrews (1) and washers (2) in control panel (3) and service-air valve.

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505478

4-49. CONTROL PANEL REPLACEMENT.

This Tasks Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Battery cables disconnected (see paragraph 4-57).
- Engine starting aid cable removed (see paragraph 4-28).
- Stop cable removed (see paragraph 4-29).
- Light switch removed (see paragraph 4-45).
- Start switch removed (see paragrapn 4-46).
- Safety circuit bypass switch removed (see paragraph 4-47).
- Service-air valve removed (see paragraph 4-48).
- Shutdown relay removed (see paragraph 4-62).

Materials/Parts:

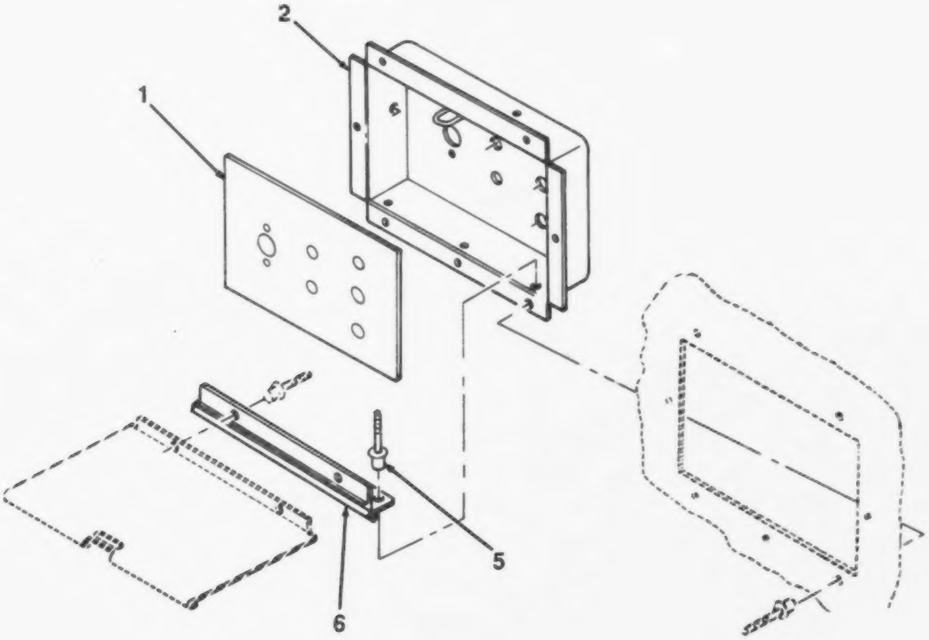
- Twelve rivets

Tools/Test Equipment:

- Electric drill
- Rivet gun
- Twist drill bit, ⅛ in.

a. REMOVAL

1. Remove identification marker (1) from control panel (2).
2. Using electric drill and ⅛ in. twist drill bit, remove 3 rivets (5) from hinge (6) and control panel (2). Discard rivets.



TA505479

4-49. CONTROL PANEL REPLACEMENT (Con't).

3. Remove access door (7) and hinge (6) from control panel (2).
4. Using electric drill and ⅛ in. twist drill bit, remove 7 rivets (4) from housing (3) and control panel (2).
5. Remove control panel (2) from housing (3). Discard rivets (4).

NOTE

Perform step 6 only if access door or hinge is damaged.

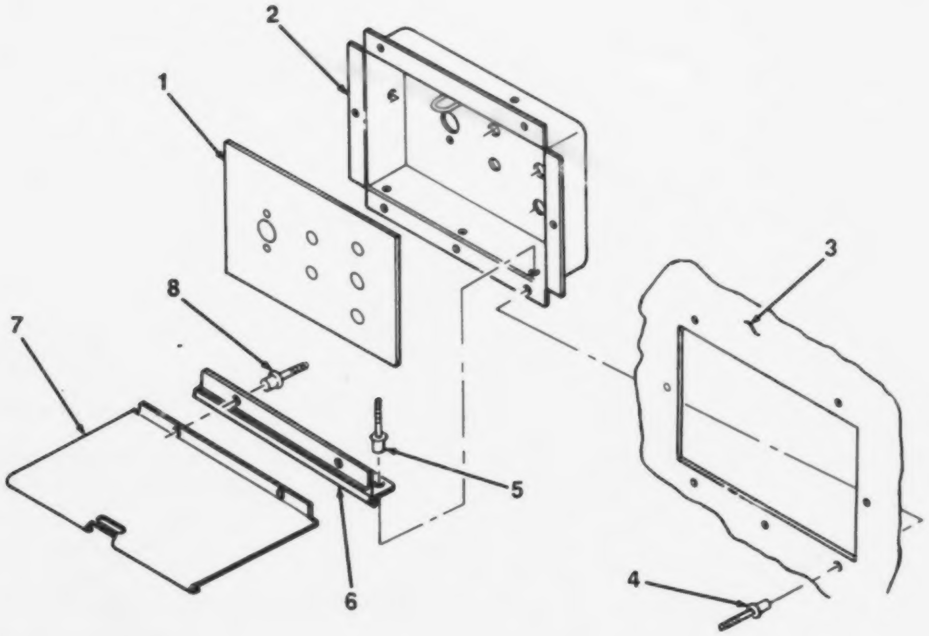
6. Using electric drill and ⅛ in. twist drill bit, remove 2 rivets (8) from hinge (6) and access door (7). Discard damaged part and rivets.

b. INSTALLATION

NOTE

Perform step 1 only if hinge or access door is new.

1. Position hinge (6) on access door (7). Using rivet gun, install 2 new rivets (8).
2. Position control panel (2) in place in housing (3). Using rivet gun, install 7 new rivets (4).
3. Position hinge (6) and access door (7) in place on control panel (2). Using rivet gun, install 3 new rivets (5).
4. Install identification marker (1) in control panel (2).



TA505480

4-49. CONTROL PANEL REPLACEMENT (Con't).

FOLLOW-ON TASKS:

- Install shutdown relay (see paragraph 4-62).
- Install service-air valve (see paragraph 4-48).
- Install safety circuit bypass switch (see paragraph 4-47).
- Install start switch (see paragraph 4-46).
- Install light switch (see paragraph 4-45).
- Install stop cable (see paragraph 4-29).
- Install engine starting aid cable (see paragraph 4-28).
- Connect battery cables (see paragraph 4-57).
- Close left and right door assemblies.

4-50. COMPRESSOR OIL TEMPERATURE GAGE AND FUEL LEVEL GAGE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Battery cables disconnected (see paragraph 4-57).

Tools/Test Equipment:

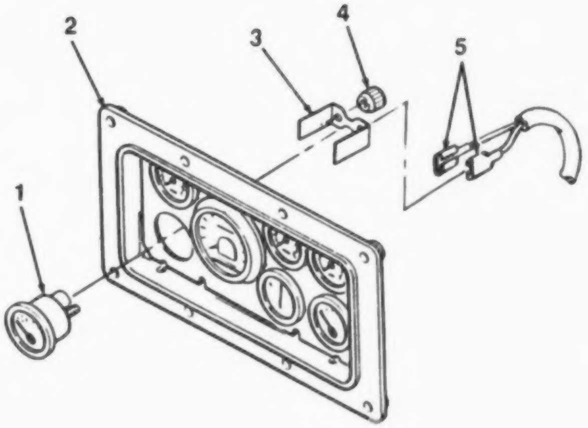
- General mechanic's tool kit

NOTE

Use this task to replace compressor oil temperature gage or fuel level gage. Compressor oil temperature gage is shown.

a. REMOVAL

1. Remove window (see paragraph 4-55).
2. Remove 3 electrical leads (5) from compressor oil temperature gage (1).
3. Unscrew 2 knurled nuts (4) from compressor oil temperature gage (1).
4. Remove retainer (3) and compressor oil temperature gage (1) from indicator panel (2).



b. INSTALLATION

1. Position compressor oil temperature gage (1) in place in indicator panel (2).
2. Install retainer (3) and 2 knurled nuts (4) on compressor oil temperature gage (1).
3. Install 3 electrical leads (5) on compressor oil temperature gage (1).
4. Install window (see paragraph 4-55).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505481

4-51. DISCHARGE PRESSURE GAGE AND FUEL PRESSURE GAGE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Battery cables disconnected (see paragraph 4-57).

Tools/Test Equipment:

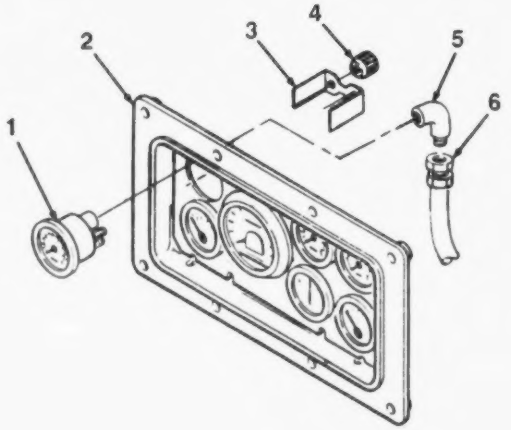
- General mechanic's tool kit

NOTE

Use this task to replace discharge pressure gage or fuel pressure gage. Discharge pressure gage is shown.

a. REMOVAL

1. Remove window (see paragraph 4-55).
2. Remove hose (6) from elbow (5). Remove elbow from discharge pressure gage (1).
3. Remove 2 knurled nuts (4) and retainer (3) from discharge pressure gage (1).
4. Remove discharge pressure gage (1) from indicator panel (2).



b. INSTALLATION

1. Position discharge pressure gage (1) in place in indicator panel (2).
2. Install retainer (3) and 2 knurled nuts (4) on discharge pressure gage (1).
3. Install elbow (5) and hose (6) on discharge pressure gage (1).
4. Install window (see paragraph 4-55).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505482

4-52. TACH/HOURMETER REPLACEMENT.

This Task Covers:

a. Removal b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Battery cables disconnected (see paragraph 4-57).

Materials/Parts:

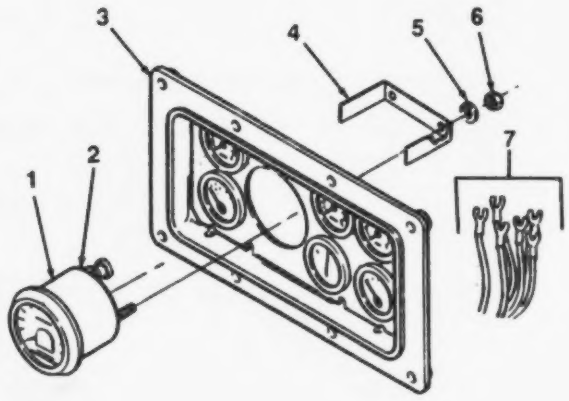
- Two lockwashers

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Remove window (see paragraph 4-55).
2. Loosen 3 screws (2) and remove 5 electrical leads (7) from tach/hourmeter (1).
3. Remove 2 nuts (6), lockwashers (5), and retainer (4) from tach/hourmeter (1). Discard lockwashers.
4. Remove tach/hourmeter (1) from indicator panel (3).



b. INSTALLATION

1. Position tach/hourmeter (1) in place in indicator panel (3).
2. Install retainer (4), 2 new lockwashers (5), and nuts (6) on tach/hourmeter (1).
3. Install 5 electrical leads (7) on tach/hourmeter (1) and tighten 3 screws (2).
4. Install window (see paragraph 4-55).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505483

4-53. AMMETER REPLACEMENT.

This Task Covers:

a. Removal
b. Installation

Initial Setup:

Equipment Conditions:

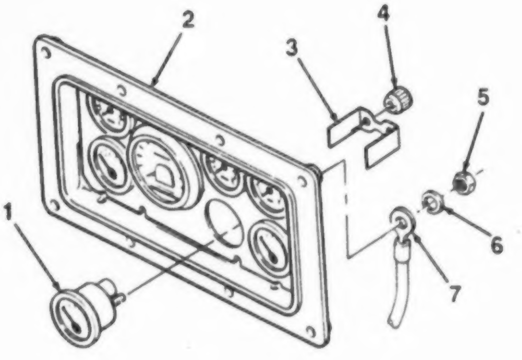
- Engine off.
- Left door assembly open.
- Battery cables disconnected (see paragraph 4-57).

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Remove window (see paragraph 4-55).
2. Remove 2 nuts (5), washers (6), and electrical leads (7) from ammeter (1).
3. Remove 2 knurled nuts (4) and retainer (3) from ammeter (1).
4. Remove ammeter (1) from indicator panel (2).



b. INSTALLATION

1. Position ammeter (1) in place in indicator panel (2).
2. Install retainer (3) and 2 knurled nuts (4) on ammeter (1).
3. Install 2 electrical leads (7), washers (6), and nuts (5) on ammeter (1).
4. Install window (see paragraph 4-55).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505484

4-54. ENGINE OIL PRESSURE GAGE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

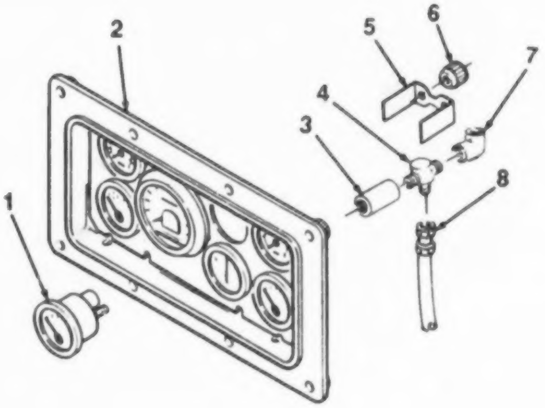
- Engine off.
- Left door assembly open.
- Battery cables disconnected (see paragraph 4-57).
- Oil pressure switch removed (see paragraph 4-41).

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Remove window (see paragraph 4-55).
2. Remove hose (8) from tee (4). Remove elbow (7), tee, and adapter (3) from engine oil pressure gage (1).
3. Remove 2 knurled nuts (6) and retainer (5) from engine oil pressure gage (1). Remove engine oil pressure gage from indicator panel (2).



b. INSTALLATION

1. Position engine oil pressure gage (1) in place in indicator panel (2). Install retainer (5) and 2 knurled nuts (6) on engine oil pressure gage.
2. Install adapter (3), tee (4), and elbow (7) on engine oil pressure gage (1).
3. Install hose (8) on tee (4).
4. Install window (see paragraph 4-55).

FOLLOW-ON TASKS:

- Install oil pressure switch (see paragraph 4-41).
- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505485

4-55. INDICATOR PANEL ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

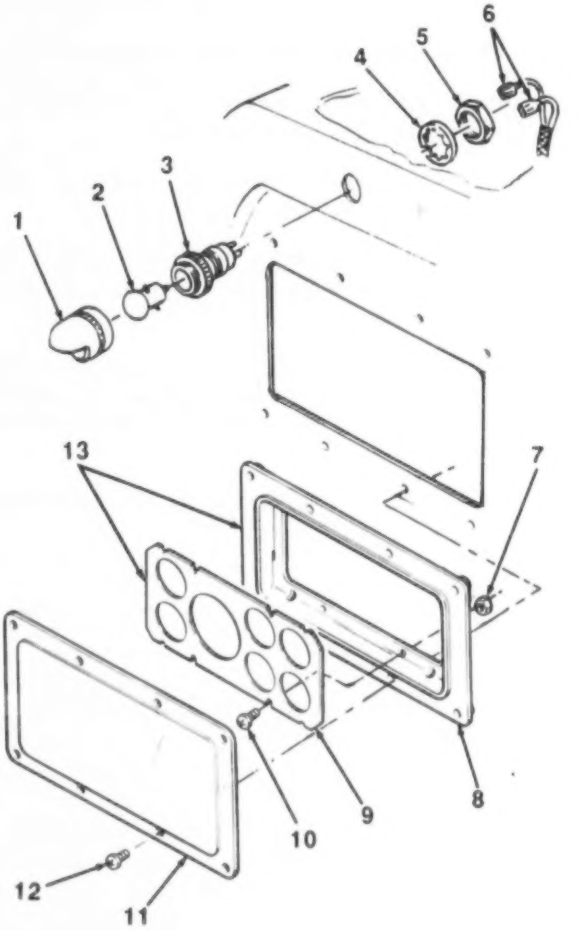
- Engine off.
- Battery cables disconnected (see paragraph 4-57).
- Left door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Disconnect 2 wire leads (6) from lamp assembly (3). Remove nut (5) and starwasher (4) from lamp assembly.
2. Remove lamp assembly (3) from compressor unit.
3. Remove hood (1) and bulb (2) from lamp assembly (3). Discard bulb if necessary.
4. Unscrew 8 screws (12) and remove window (11).
5. Remove compressor oil temperature gage and fuel level gage (see paragraph 4-50).
6. Remove discharge pressure gage and fuel pressure gage (see paragraph 4-51).
7. Remove tach/hourmeter (see paragraph 4-52).
8. Remove ammeter (see paragraph 4-53).
9. Remove engine oil pressure gage (see paragraph 4-54).
10. Remove oil pressure switch (see paragraph 4-41).
11. Push in on indicator panel assembly (13) and remove from housing.
12. Remove 4 screws (10) and nuts (7) from gage panel (9) and frame (8).
13. Remove gage panel (9) from frame (8).

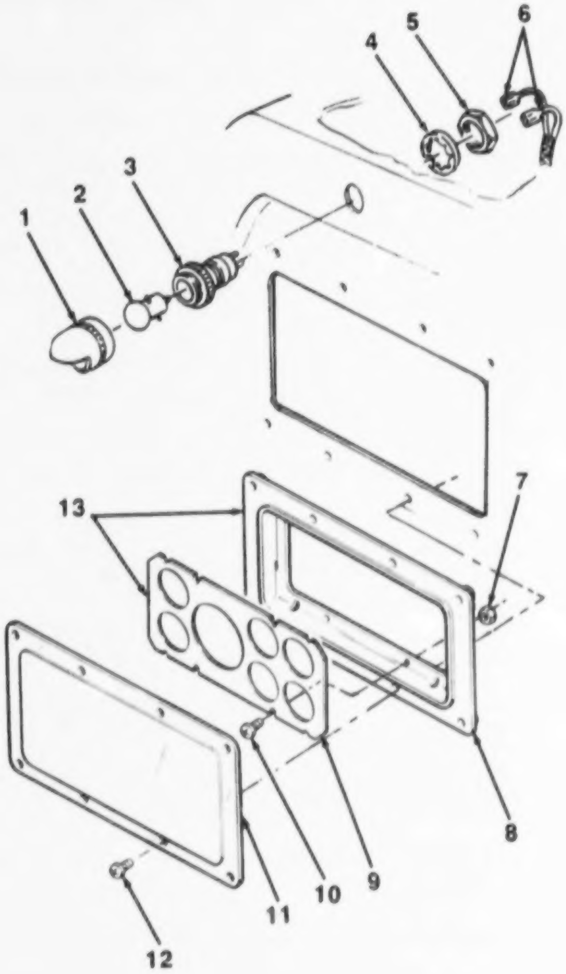


TA505486

4-55. INDICATOR PANEL ASSEMBLY REPLACEMENT (Con't).

b. INSTALLATION

1. Position gage panel (9) in frame (8) and install 4 screws (10) and nuts (7).
2. Position indicator panel assembly (13) in place in housing.
3. Install engine oil pressure gage (see paragraph 4-54).
4. Install oil pressure switch (see paragraph 4-41).
5. Install ammeter (see paragraph 4-53).
6. Install tach/hourmeter (see paragraph 4-52).
7. Install discharge pressure gage and fuel pressure gage (see paragraph 4-51).
8. Install compressor oil temperature gage and fuel level gage (see paragraph 4-50).
9. Position window (11) in place on housing over indicator panel assembly (13) and install 8 screws (12).
10. Position lamp assembly (3) in place on compressor unit and install starwasher (4) and nut (5). Connect 2 wire leads (6) to lamp assembly.
11. Install bulb (2) and hood (1) on lamp assembly (3).



FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505487

4-56. JUNCTION BOX MAINTENANCE.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Right door assembly open.
- Spare tire removed (see paragraph 4-75).
- Battery cables disconnected (see paragraph 4-57).

Materials/Parts:

- Twelve self-locking nuts
- Six lockwashers

Tools/Test Equipment:

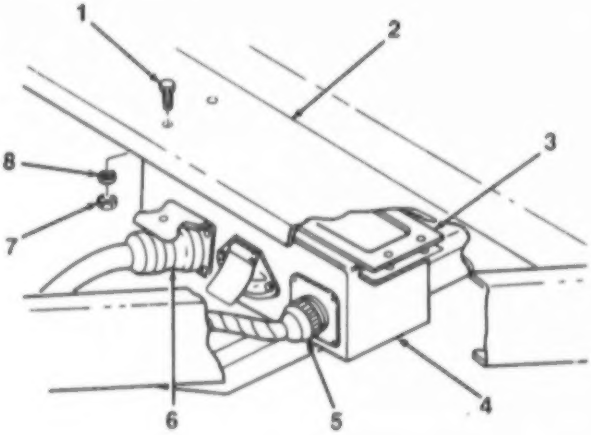
- General mechanic's tool kit

a. REMOVAL

1. Disconnect trailer harness (5) and intervehicular cable (6) from junction box (4).

2. Remove 4 bolts (1), washers (8), and self-locking nuts (7) from junction box (4) and drawbar crossmember (2). Discard self-locking nuts.

3. Remove junction box (4) and gasket (3). Discard gasket if torn.



TA505488

4-56. JUNCTION BOX MAINTENANCE (Con't).

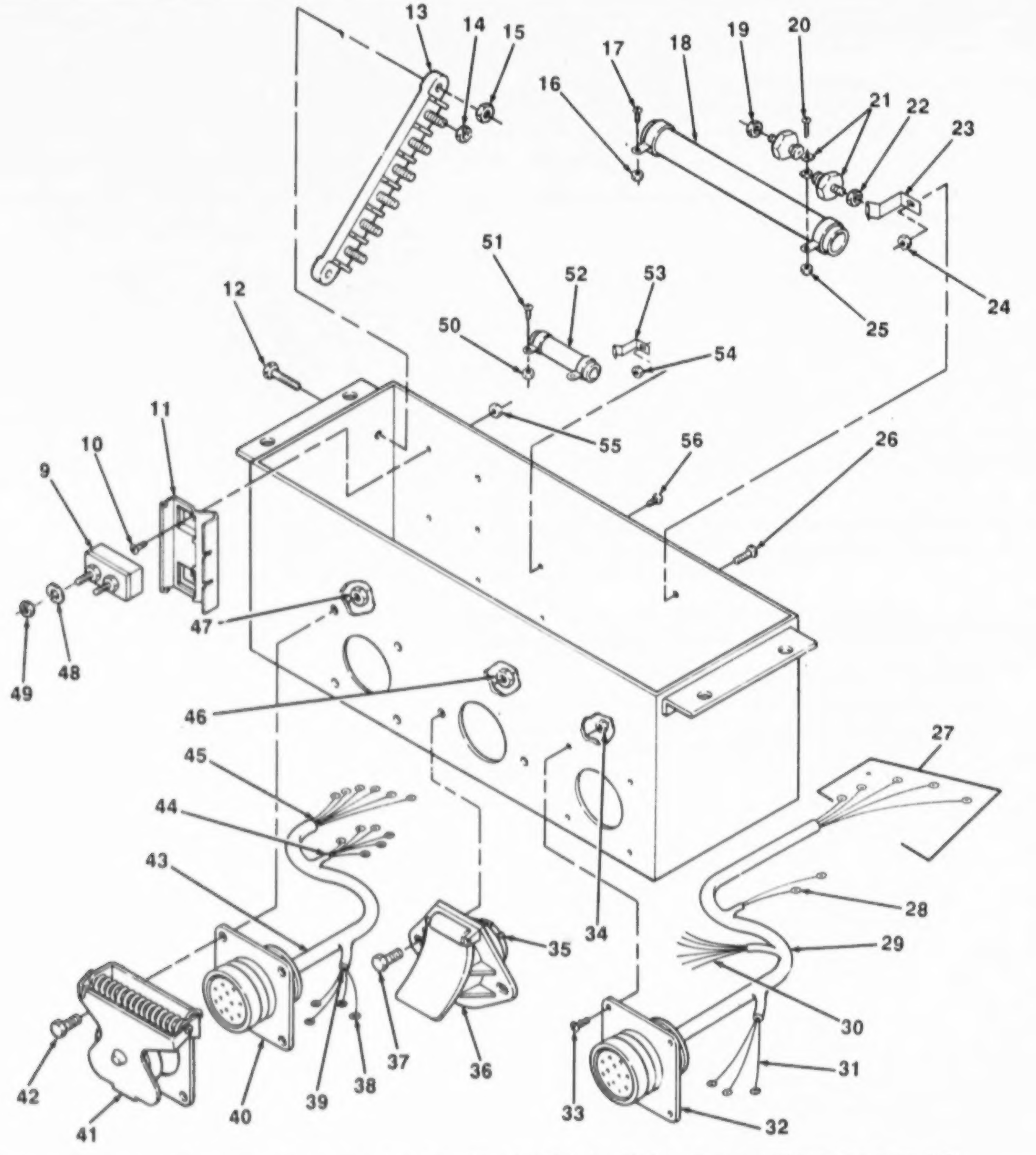
b. DISASSEMBLY

1. Remove 5 nuts (14), electrical leads (27), and 6 electrical leads (45) from terminal block (13).
2. Remove 2 bolts (12), self-locking nuts (15), and terminal block (13) from junction box (4). Discard self-locking nuts.
3. Remove 6 nuts (49), lockwashers (48), and electrical leads (44) from 3 circuit breakers (9). Remove circuit breakers from bracket (11). Discard lockwashers.
4. Remove 2 screws (10), nuts (55), and bracket (11) from junction box (4).
5. Remove screw (17), nut (16), and electrical lead (38) from resistor (18).
6. Remove 2 nuts (19 and 22) and electrical leads (39) from diodes (21). Remove screw (20), nut (25), and diodes from resistor (18).
7. Remove 2 screws (26), nuts (24), mounting clips (23), resistor (18), and electrical leads (31) from junction box (4).
8. Remove 4 screws (51), nuts (50), and electrical leads (28 and 39) from 2 resistors (52).
9. Remove 4 screws (56), nuts (54), mounting clips (53), and 2 resistors (52) from junction box (4).
10. Remove 2 capscrews (37) and self-locking nuts (46) from receptacle connector (36) and junction box (4). Discard self-locking nuts.
11. Pull receptacle connector (36) out of junction box (4). Loosen 6 screws (35) and remove electrical leads (30) from receptacle connector.
12. Remove 4 screws (33) and nuts (34) from receptacle connector (32) and junction box (4). Remove receptacle connector and wiring harness (29).
13. Remove 4 capscrews (42), self-locking nuts (47), connector cover (41), receptacle connector (40) and wiring harness (43) from junction box (4). Discard self-locking nuts.

c. ASSEMBLY

1. Position receptacle connector (40) and wiring harness (43) in place in junction box (4). Install connector cover (41), 4 capscrews (42), and new self-locking nuts (47).
2. Position receptacle connector (32) and wiring harness (29) in place in junction box (4). Install 4 screws (33) and nuts (34).
3. Position receptacle connector (36) at connector opening. Install 6 electrical leads (30) and tighten 6 screws (35).
4. Install receptacle connector (36), 2 capscrews (37), and new self-locking nuts (46) in junction box (4).
5. Install 2 resistors (52), 4 mounting clips (53), nuts (54), and screws (56) in junction box (4).
6. Install 4 electrical leads (28 and 39) on 2 resistors (52) with 4 screws (51) and nuts (50).
7. Install resistor (18), electrical lead (31), and 2 mounting clips (23) in junction box (4) with 2 screws (26) and nuts (24).
8. Install 2 diodes (21) on resistor (18) with screw (20) and nut (25). Install 2 electrical leads (39) and nuts (19) on diodes.
9. Install electrical lead (38) on resistor (18) with screw (17) and nut (16).
10. Install bracket (11) in junction box (4) with 2 screws (10) and nuts (55). Install 3 circuit breakers (9) in bracket (11).
11. Install 6 electrical leads (44), new lockwashers (48), and nuts (49) on circuit breakers (9).

4-56. JUNCTION BOX MAINTENANCE (Con't).



12. Install terminal block (13) in junction box (4) with 2 bolts (12) and new self-locking nuts (15).

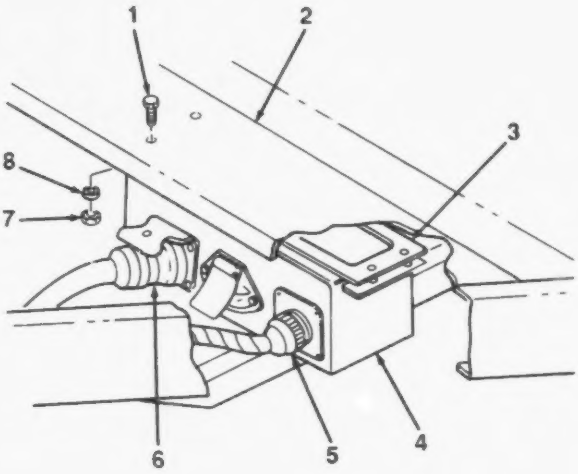
13. Install 5 electrical leads (27), 6 electrical leads (45), and 5 nuts (14) on terminal block (13).

TA505489

4-56. JUNCTION BOX MAINTENANCE (Con't).

d. INSTALLATION

1. Position junction box (4) and gasket (3) in place under drawbar crossmember (2). Install 4 bolts (1), washers (8), and new self-locking nuts (7).
2. Connect trailer harness (5) and intervehicular cable (6).



FOLLOW-ON TASKS:

- Install spare tire (see paragraph 4-75).
- Connect battery cables (see paragraph 4-57).
- Close right door assembly.

TA505490

4-57. STORAGE BATTERIES REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Right door assembly open.

General Safety Instructions:

- Always wear goggles and rubber gloves when performing battery checks or inspections.
- DO NOT perform battery checks while smoking or near fire, flames, or sparks.
- Remove all jewelry.

Materials/Parts:

- Four lockwashers

Tools/Test Equipment:

- General mechanic's tool kit
- Battery strap

WARNING

- **Battery acid (electrolyte) is extremely dangerous. Always wear goggles and rubber gloves when performing battery checks or inspections. Serious injury to personnel will result if battery acid contacts skin or eyes.**
- **DO NOT perform battery system checks or inspections while smoking or near fire, flames, or sparks. Batteries may explode, causing serious injury or death to personnel.**
- **Remove all jewelry such as dog tags, rings, bracelets, etc. If jewelry or disconnected battery ground cable contacts battery terminal, a direct short will result. Failure to follow proper disconnection procedures will result in serious injury or death to personnel, or equipment damage.**

4-57. STORAGE BATTERIES REPLACEMENT (Con't).

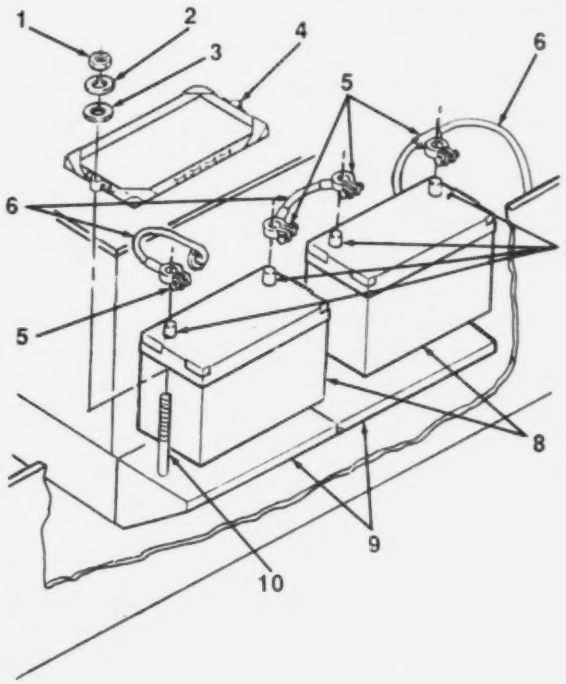
a. REMOVAL

1. Loosen 4 clamps (5) on battery terminals (7) and remove battery cables (6).
2. Remove 4 nuts (1), lockwashers (2), flatwashers (3), hook bolts (10), and 2 battery retainers (4) from storage batteries (8). Discard lockwashers.

WARNING

Storage batteries are heavy. To prevent injury, use battery strap to remove storage batteries.

3. Remove 2 storage batteries (8) from battery trays (9).



b. INSTALLATION

WARNING

Storage batteries are heavy. To prevent injury, use battery strap to install storage batteries.

1. Position storage batteries (8) in place on battery trays (9).
2. Install 4 hook bolts (10), flatwashers (3), new lockwashers (2), nuts (1), and 2 battery retainers (4) on storage batteries (8).
3. Install battery cables (6) on battery terminals (7) and tighten clamps (5).

FOLLOW-ON TASKS:

- Close right door assembly.

TA505491

4-58. TRAILER LIGHTS REPLACEMENT.

This Task Covers:

a. Removal of Blackout Light
b. Installation of Blackout Light
c. Removal of Marker Light
d. Installation of Marker Light
e. Removal of Vehicular Lamp Unit
f. Installation of Vehicular Lamp Unit

Initial Setup:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).

Materials/Parts:

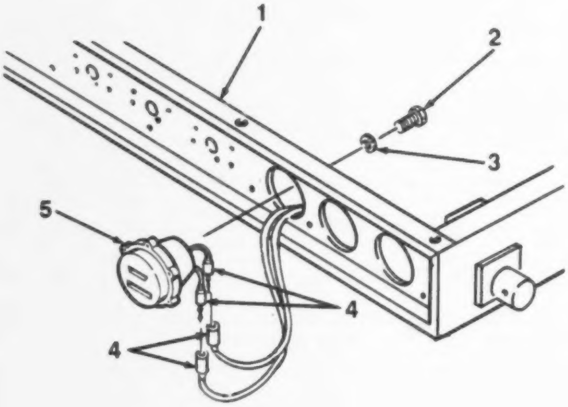
- Two lockwashers

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL OF BLACKOUT LIGHT

1. Remove 2 capscrews (2) and lockwashers (3) from blackout light (5). Discard lockwashers.
2. Remove blackout light (5) from tailboard (1).
3. Disconnect 2 electrical leads (4).



b. INSTALLATION OF BLACKOUT LIGHT

1. Connect 2 electrical leads (4).
2. Position blackout light (5) in place in tailboard (1).
3. Install 2 capscrews (2) and new lockwashers (3) in blackout light (5).

TA505492

4-58. TRAILER LIGHTS REPLACEMENT (Con't).

c. REMOVAL OF MARKER LIGHT

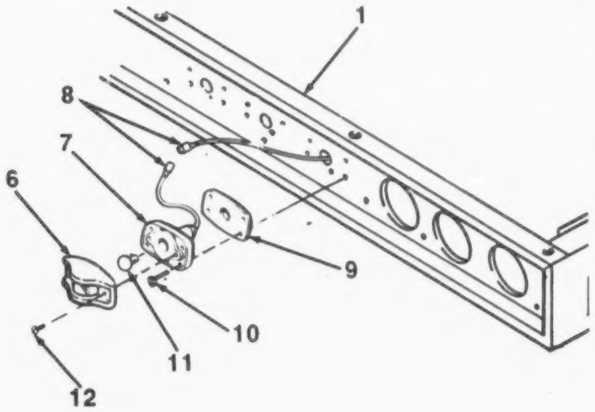
NOTE

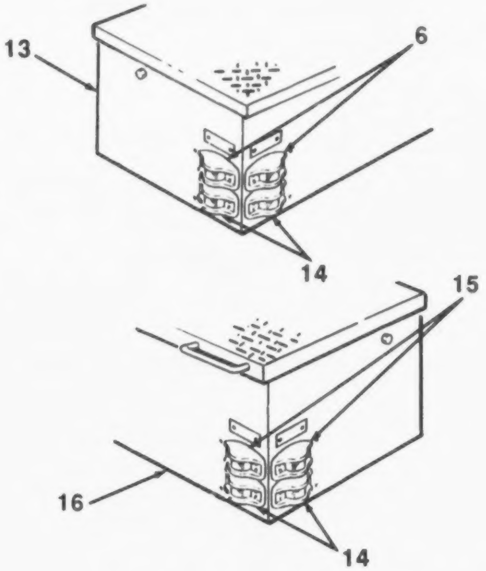
- **There are 19 marker lights (7) on the compressor unit as follows:**
- **7 marker lights with red lens covers (6), located on the tailboard (1) and rear toolboxes (13).**
- **4 marker lights with amber lens covers (15), located on the front toolboxes (16).**
- **8 marker lights with military blackout lens covers (14), located on the front and rear toolboxes (13 and 16).**
- **Marker light (7) on tailboard (1) with red lens cover (6) is shown.**

1. Remove 2 screws (12) and lens cover (6) from marker light (7).
2. Remove 4 screws (10), marker light (7), and gasket (9).
3. Disconnect electrical lead (8).
4. Remove incandescent lamp (11) from marker light (7).

d. INSTALLATION OF MARKER LIGHT

1. Install incandescent lamp (11) in marker light (7).
2. Connect electrical lead (8).
3. Position marker light (7) and gasket (9) in place and install 4 screws (10).
4. Install lens cover (6) on marker light (7) with 2 screws (12).

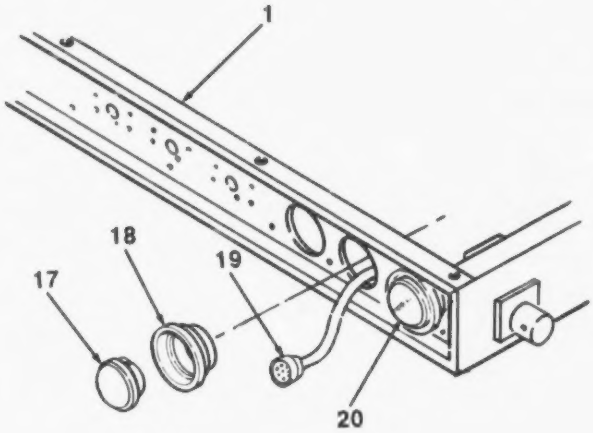




TA505493

4-58. TRAILER LIGHTS REPLACEMENT (Con't).

e. REMOVAL OF VEHICULAR LAMP UNIT



NOTE

The inboard lamp unit is stop and taillight with 3 conductors. The outboard lamp unit (20) is a stop or taillight, and has 2 conductors. The inboard lamp unit is shown.

1. Push lamp unit (17) out of grommet (18) and unplug wiring harness (19).
2. Remove grommet (18) from tailboard (1).

f. INSTALLATION OF VEHICULAR LAMP UNIT

1. Install grommet (18) in tailboard (1).
2. Route wiring harness (19) through grommet (18) and plug in lamp unit (17).
3. Install lamp unit (17) in grommet (18).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).

TA505494

4-59. SOLENOID VALVE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Battery cables disconnected (see paragraph 4-57).

Materials/Parts:

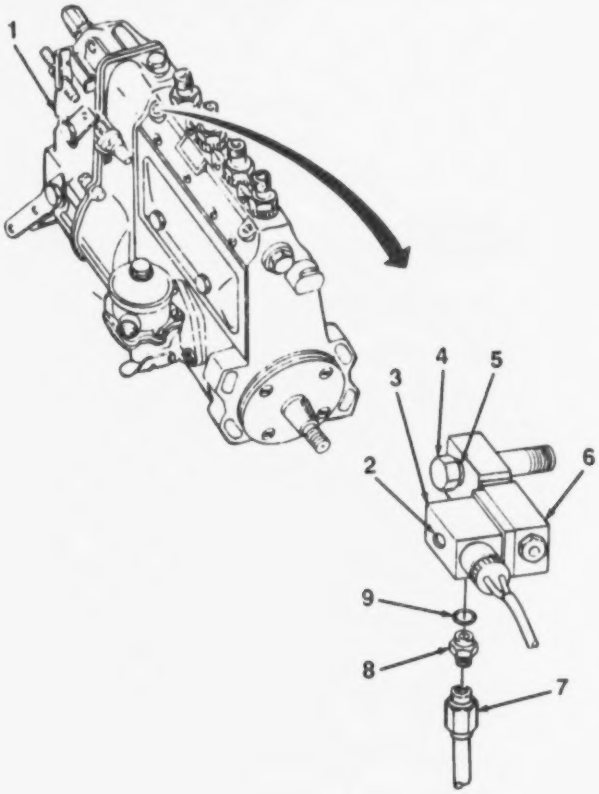
- One gasket

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Loosen screw (2) and disconnect electrical connector (3) from solenoid valve (6).
2. Disconnect fuel line (7) from adapter (8).
3. Remove fluid passage bolt (4), 2 washers (5), and solenoid valve (6) from injection pump (1).
4. Remove adapter (8) and gasket (9) from solenoid valve (6). Discard gasket.



b. INSTALLATION

1. Install adapter (8) and new gasket (9) on solenoid valve (6).
2. Install solenoid valve (6), 2 washers (5), and fluid passage bolt (4) on injection pump (1).
3. Connect fuel line (7) to adapter (8).
4. Connect electrical connector (3) to solenoid valve (6) and tighten screw (2).

FOLLOW-ON TASKS:

- Close left door assembly.

TA505495

4-60. SLAVE RECEPTACLE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Right door assembly open.
- Storage batteries removed (see paragraph 4-57).

Tools/Test Equipment:

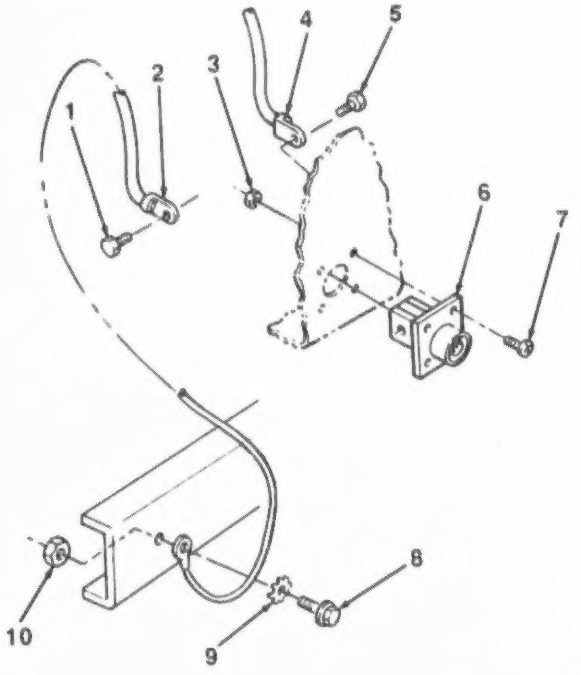
- General mechanic's tool kit

Materials/Parts:

- One lockwasher
- One self-locking nut

a. REMOVAL

1. Remove capscrew (1) and electrical lead (2) from slave receptacle (6).
2. Remove capscrew (5) and battery cable (4) from slave receptacle (6).
3. Remove 4 screws (7), nuts (3), and slave receptacle (6).
4. Remove capscrew (8), lockwasher (9), electrical lead (2), and self-locking nut (10). Discard lockwasher and self-locking nut.



b. INSTALLATION

1. Install capscrew (8), new lockwasher (9), electrical lead (2), and new self-locking nut (10).
2. Position slave receptacle (6) in place and install 4 screws (7) and nuts (3).
3. Install capscrew (5) and battery cable (4) on slave receptacle (6).
4. Install capscrew (1) and electrical lead (2) on slave receptacle (6).

FOLLOW-ON TASKS:

- Install storage batteries (see paragraph 4-57).
- Close right door assembly.

TA505496

4-61. MAGNETIC STARTER SWITCH REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Right door assembly open.
- Battery cables disconnected (see paragraph 4-57).

Materials/Parts:

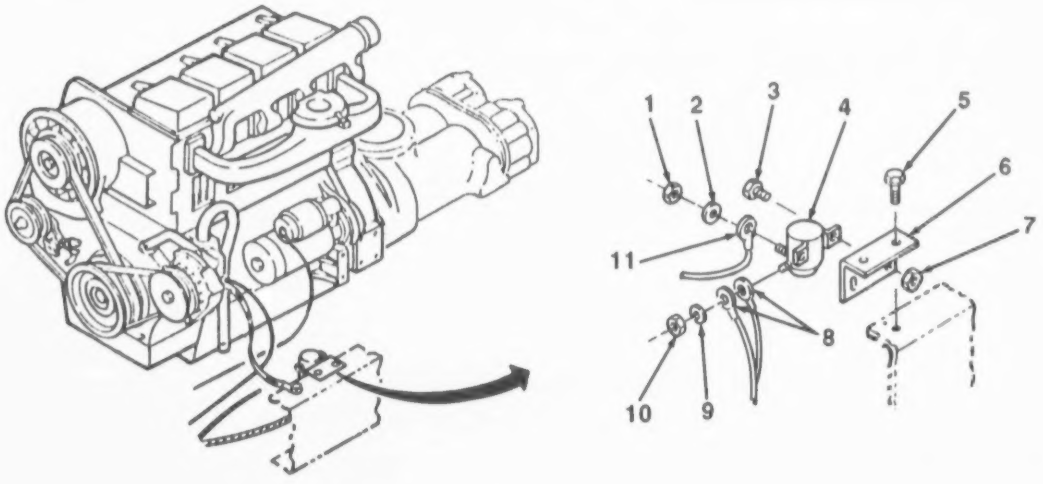
- Four lockwashers

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Remove 2 screws (5) from bracket (6).
2. Remove 2 nuts (10), lockwashers (9), and 3 electrical leads (8) from magnetic starter switch (4). Discard lockwashers.
3. Remove 2 nuts (1), lockwashers (2), and electrical leads (11) from magnetic starter switch (4). Discard lockwashers.
4. Remove 2 screws (3), nuts (7), and magnetic starter switch (4) from bracket (6).



TA505497

4-61. MAGNETIC STARTER SWITCH REPLACEMENT (Con't).

b. INSTALLATION

1. Install 2 screws (3), nuts (7), and magnetic starter switch (4) on bracket (6).
2. Install 2 nuts (1), new lockwashers (2), and electrical leads (11) on magnetic starter switch (4).
3. Install 2 nuts (10), new lockwashers (9), and 3 electrical leads (8) on magnetic starter switch (4).
4. Position magnetic starter switch (4) and bracket (6) in place and install 2 screws (5).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close right door assembly.

4-62. SHUTDOWN RELAY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Battery cables disconnected (see paragraph 4-57).

Materials/Parts:

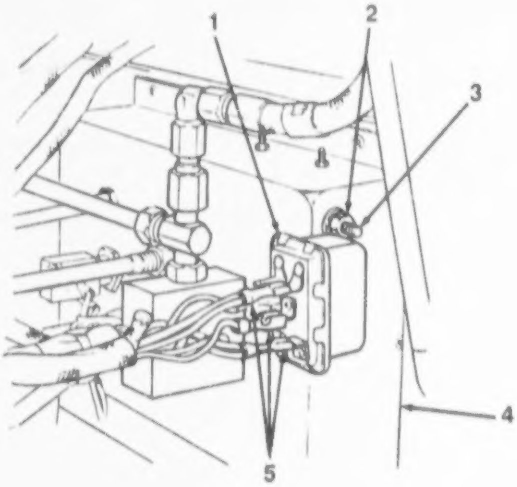
- Two self-locking nuts
- Two self-locking screws

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Disconnect 5 electrical leads (5) from shutdown relay (1).
2. Remove 2 self-locking screws (3), nuts (2), and shutdown relay (1) from control panel (4). Discard self-locking screws and nuts.



b. INSTALLATION

1. Position shutdown relay (1) in place on control panel (4) and install 2 new self-locking screws (3) and nuts (2).
2. Connect 5 electrical leads (5) to shutdown relay (1).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left door assembly.

TA505498

4-63. WIRING HARNESSES.

This Task Covers: Diagrams of the Unit Wiring Harnesses

Initial Setup:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).

Tools/Test Equipment:

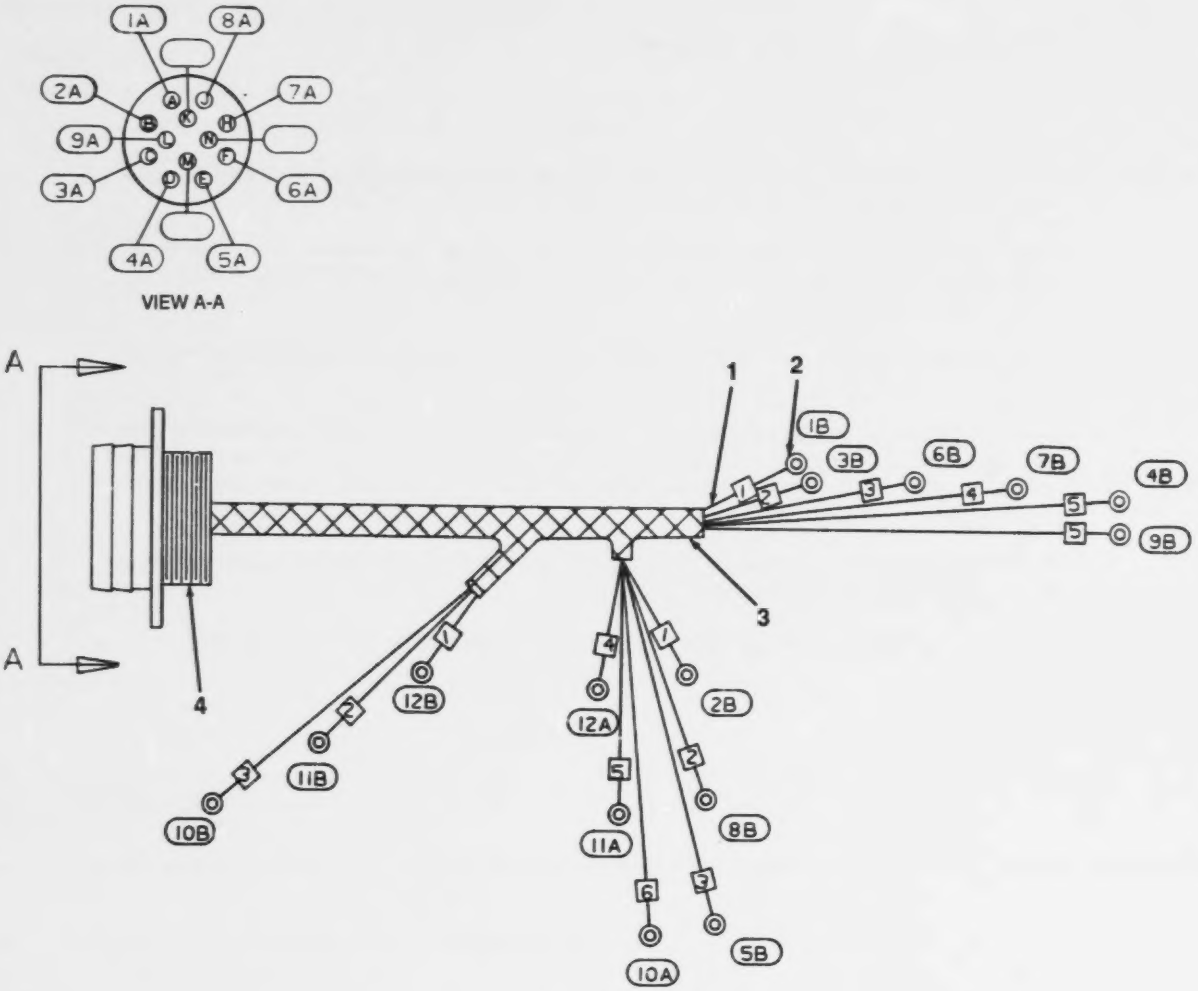
- General mechanic's tool kit

NOTE

- A switch or sending unit is more likely to be defective than a gage or indicator. The least likely cause of a problem would be in the wiring or harnesses.
- This paragraph contains diagrams of the wiring harnesses. For electrical troubleshooting procedures see Chapter 4, Section V, ELECTRICAL TROUBLESHOOTING.
- Before performing any tests of circuits, you must read and understand paragraph 4-9.
- When installing a replacement wire, be sure the wire is the same gage as the wire being replaced. Identify the new wire by using color coded tape that matches the color of the wire replaced. Match type and size of connectors from old wire for new wire.
- If a wire is spliced, use heat shrink tubing to insulate area spliced. Use a suitable heat source to shrink tubing.
- Perform continuity test on new wires before installing them into the unit.

4-63. WIRING HARNESSES (Con't).

TRAILER BOX WIRING HARNESS



1. WIRE #14 GA. (BLACK)
2. RING TONGUE
3. ELECTRICAL TAPE WRAP
4. RECEPTACLE MS-75021-2

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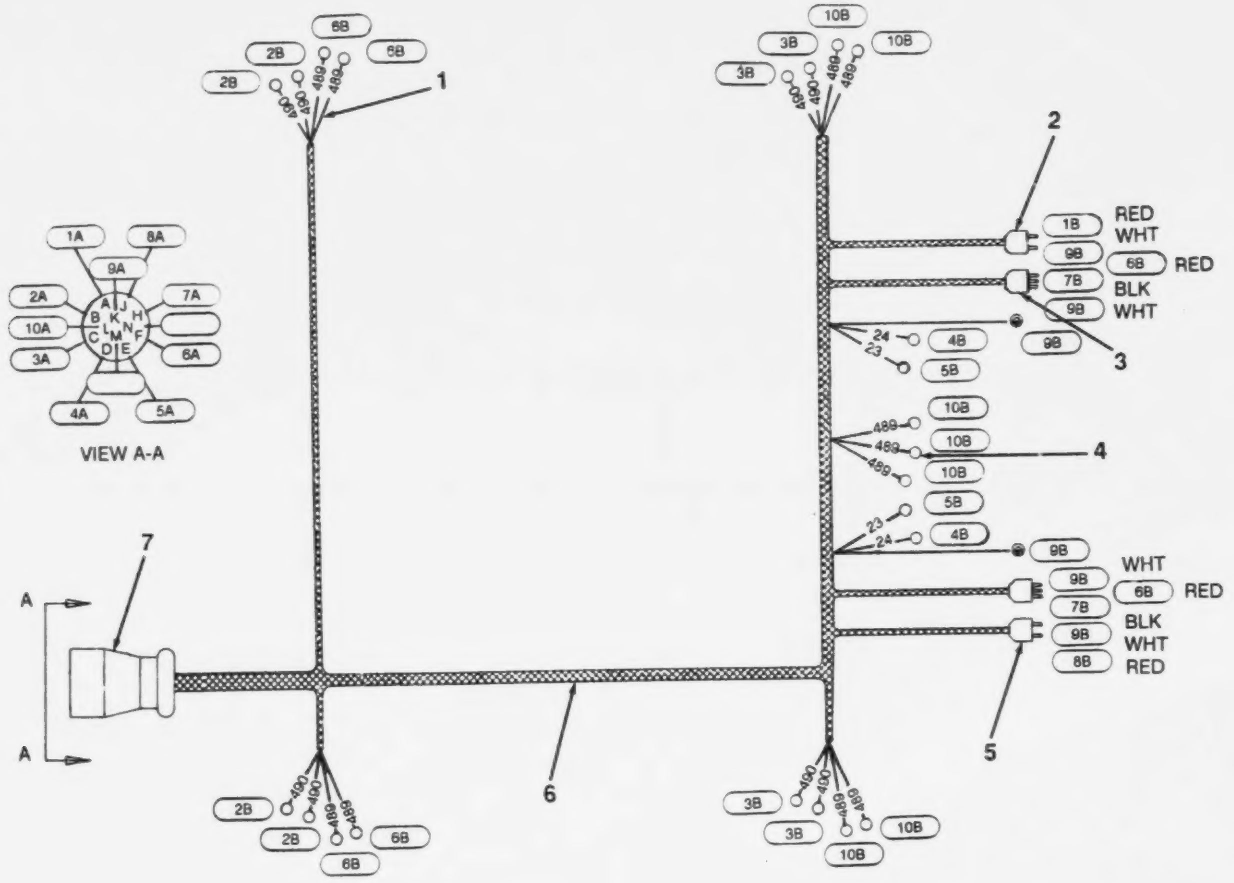
4-63. WIRING HARNESSES (Con't).

TRAILER WIRING HARNESS



1. WIRE #14 GA. (BLACK)
2. CONNECTOR (PETERSON)
3. CONNECTOR (PETERSON)
4. RING TONGUE
5. CONN MALE W/SHELL PLUG
6. ELECTRICAL TAPE WRAP
7. SHELL ASSEMBLY

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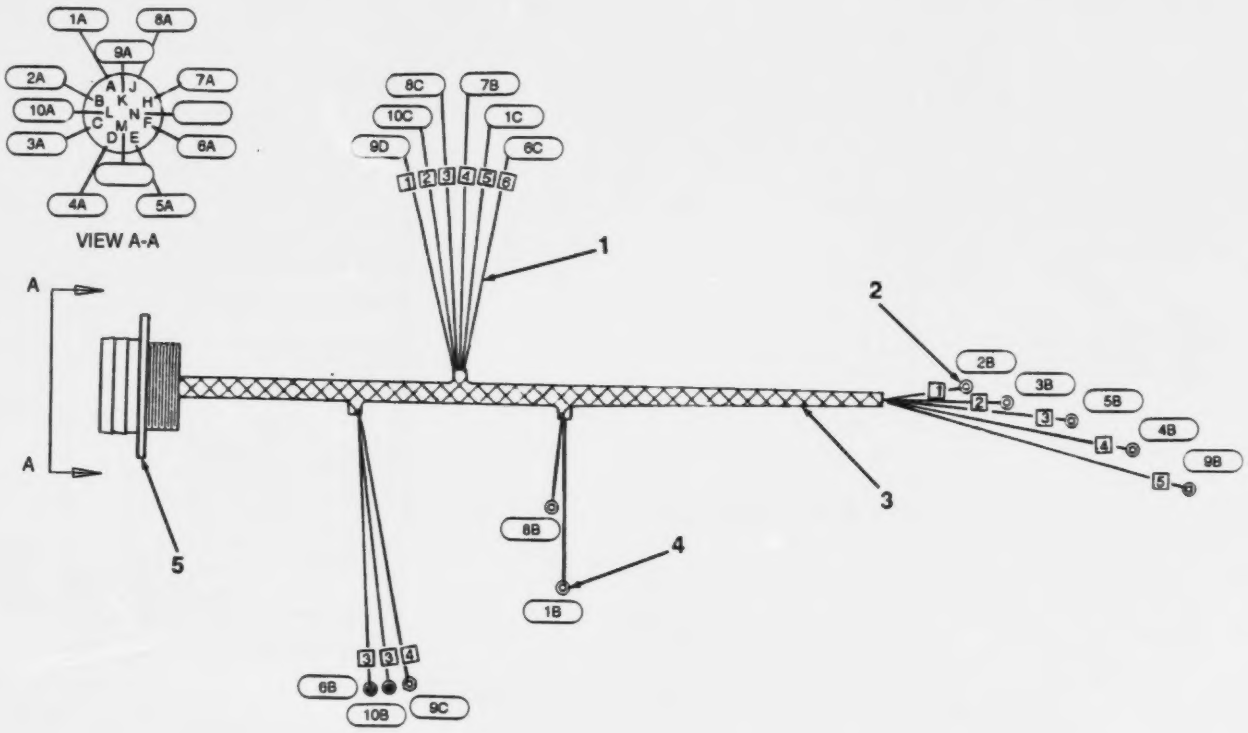
4-63. WIRING HARNESSES (Con't).

TRAILER BOX WIRING HARNESS



1. WIRE #14 GA. (BLACK)
2. RING TONGUE #10
3. ELECTRICAL TAPE WRAP
4. RING TONGUE ¼
5. RECEPTACLE 7388333

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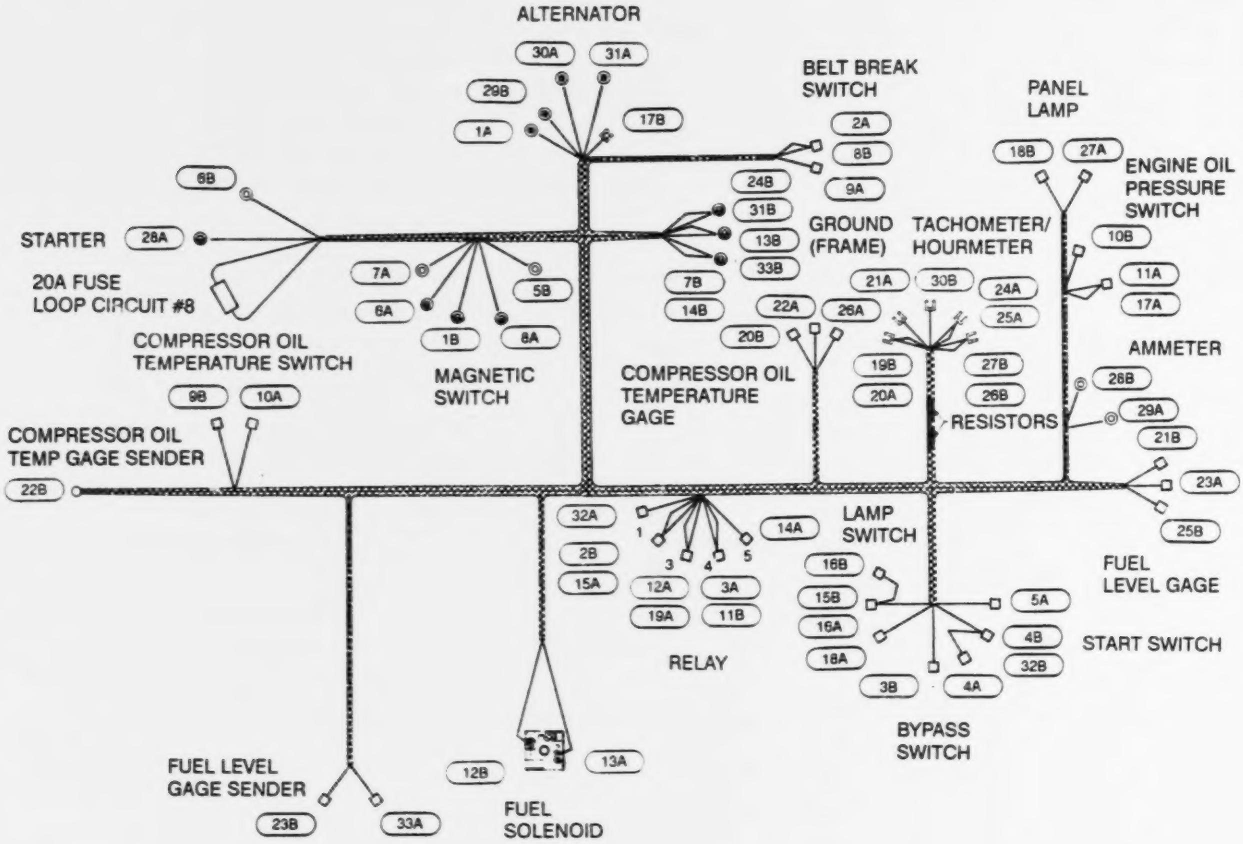
4-63. WIRING HARNESSES (Con't).

ENGINE AND INDICATORS WIRING HARNESS



TERMINAL KEY			TERMINAL KEY		
SYM	TYPE	SIZE	SYM	TYPE	SIZE
○	RING TONGUE	#8	●	RING TONGUE	⅜
◎	RING TONGUE	#10	⊏	FORK TONGUE	#6
◉	RING TONGUE	¼	☐	DISCONNECT ¼ FEMALE	

TA505502

Section X. BRAKE SYSTEM MAINTENANCE

Paragraph Number	Title	Page Number
4-64	Parking Brake Manual Control Lever Replacement	4-123
4-65	Parking Brake Cable Assemblies Replacement	4-125
4-66	Trailer Brakedrums Replacement	4-128
4-67	Trailer Brakeshoes and Wheel Cylinder Replacement	4-130
4-68	Air Chamber Replacement	4-133
4-69	Master Cylinder Reservoir Replacement	4-134
4-70	Relay Valve Replacement	4-136
4-71	Reservoir Maintenance	4-137
4-72	Hoses, Lines, and Fittings Replacement	4-140

4-64. PARKING BRAKE MANUAL CONTROL LEVER REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Trailer wheels chocked.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- One cotter pin
- Two lockwashers

4-64. PARKING BRAKE MANUAL CONTROL LEVER REPLACEMENT (Con't).

a. REMOVAL

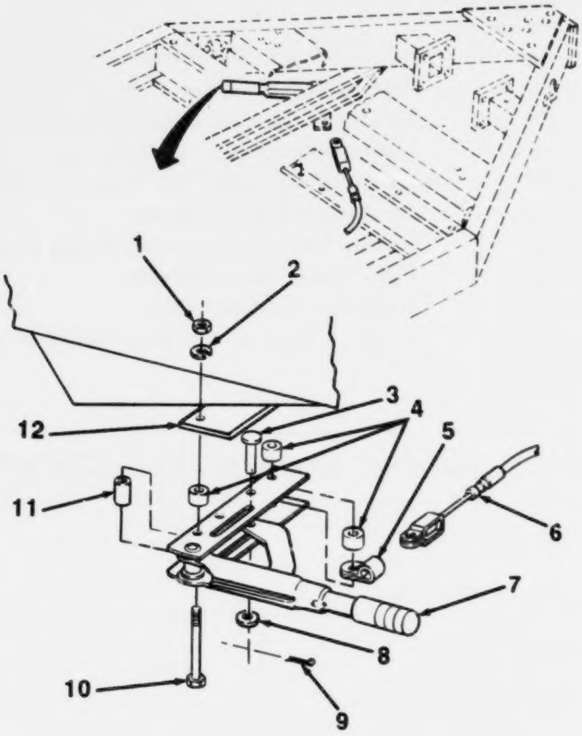
1. Remove 2 capscrews (10), lockwashers (2), nuts (1), 3 spacers (4), spacer (11), clamp (5), and manual control lever (7) from bracket (12). Discard lockwashers.

2. Remove cotter pin (9), washer (8), straight pin (3), and cable assembly (6) from manual control lever (7). Discard cotter pin.

b. INSTALLATION

1. Position cable assembly (6) in manual control lever (7) and install straight pin (3), washer (8), and new cotter pin (9).

2. Position manual control lever (7) on bracket (12). Install 2 capscrews (10), new lockwashers (2), nuts (1), clamp (5), spacer (11), and 3 spacers (4).



TA505503

4-65. PARKING BRAKE CABLE ASSEMBLIES REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Trailer parked on flat, level surface.
- Left and right front trailer tire removed (see paragraph 4-73).
- Trailer brakedrums removed (see paragraph 4-66).
- Trailer brakeshoes removed (see paragraph 4-67).

Materials/Parts:

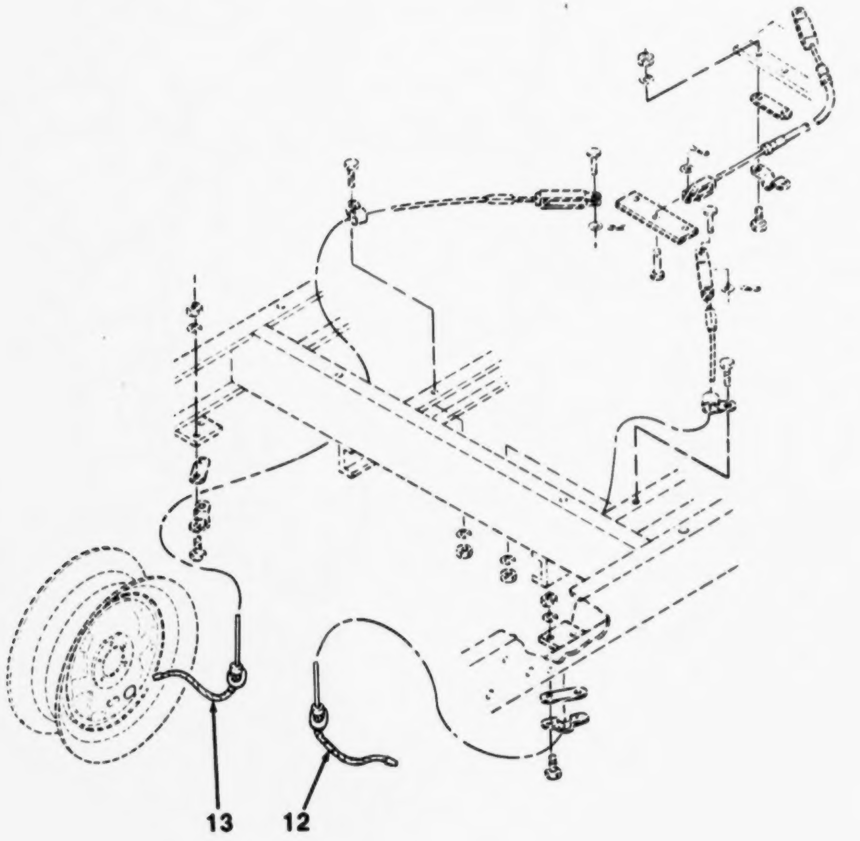
- Three cotter pins
- Eight lockwashers

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Disconnect parking brake cable assemblies (12 and 13) from brakeshoes.



TA505504

4-65. PARKING BRAKE CABLE ASSEMBLIES REPLACEMENT (Con't).

2. Remove 8 capscrews (2), lockwashers (5), nuts (6), 3 retaining straps (10) and connecting links (8), and 2 loop clamps (1) from parking brake cable assemblies (9, 12, and 13). Discard lockwashers.

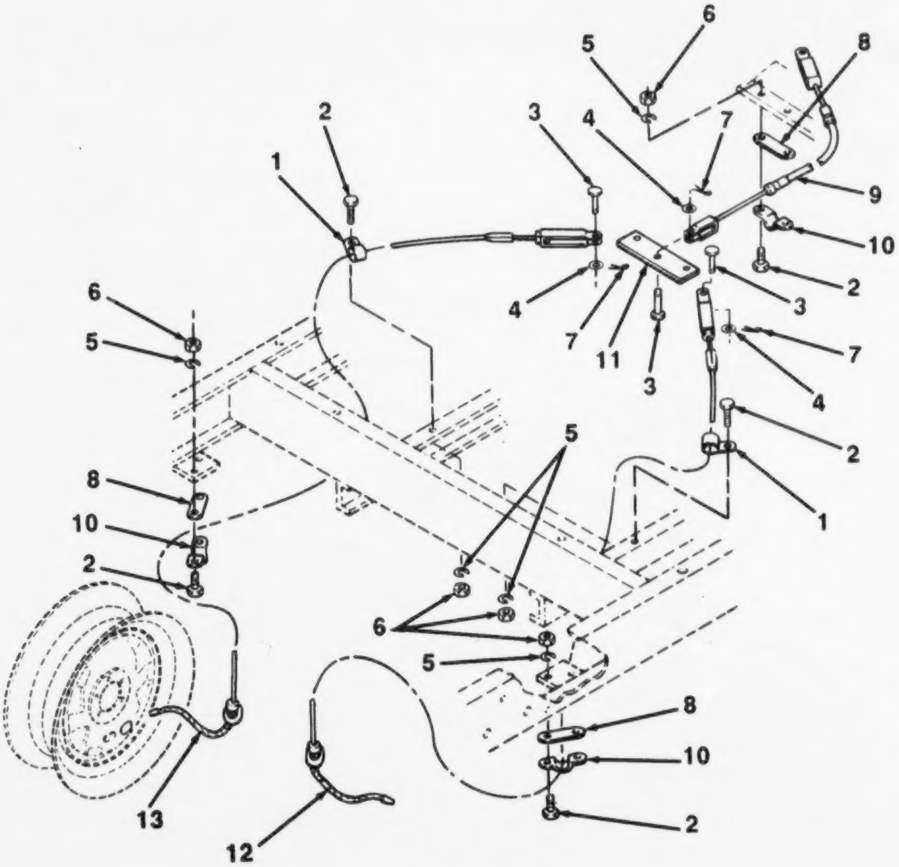
3. Remove parking brake cable assemblies (9, 12, and 13).

4. Remove 3 cotter pins (7), flatwashers (4), straight pins (3), and parking brake cable assemblies (9, 12, and 13) from equalizer bracket (11). Discard cotter pins.

b. INSTALLATION

1. Position parking brake cable assemblies (9, 12, and 13) in place on equalizer bracket (11). Install 3 straight pins (3), flatwashers (4), and new cotter pins (7).

2. Position parking brake cable assemblies (9, 12, and 13) in place on trailer frame.



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4-65. PARKING BRAKE CABLE ASSEMBLIES REPLACEMENT (Con't).

3. Install 3 retaining straps (10) and connecting links (8), and 2 loop clamps (1) on parking brake cable assemblies (9, 12, and 13) with 8 capscrews (2), new lockwashers (5), and nuts (6).

4. Connect parking brake cable assemblies (12 and 13) to brakeshoes.

FOLLOW-ON TASKS:

- Install trailer brakeshoes (see paragraph 4-67).
- Install trailer brakedrums (see paragraph 4-66).
- Install left and right front trailer tires (see paragraph 4-73).

4-66. TRAILER BRAKEDRUMS REPLACEMENT.

This Task Covers:

a. Removal
b. Inspection
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Trailer parked on flat, level surface.
- Trailer wheels chocked.
- Trailer tire removed (see paragraph 4-73).

Tools/Test Equipment:

- General mechanic's tool kit
- Seal puller

Materials/Parts:

- One cotter pin
- One grease seal

References:

- LO 4310-452-12

a. REMOVAL

1. Remove grease cap (11), cotter pin (9), castle nut (10), spindle washer (8), outer bearing (7), and cup (6) from spindle (1). Discard cotter pin.
2. Remove brakedrum (5) from spindle (1).
3. Using seal puller, remove grease seal (2) from brakedrum (5). Discard grease seal.
4. Remove cup (4) and inner bearing (3) from brakedrum (5).

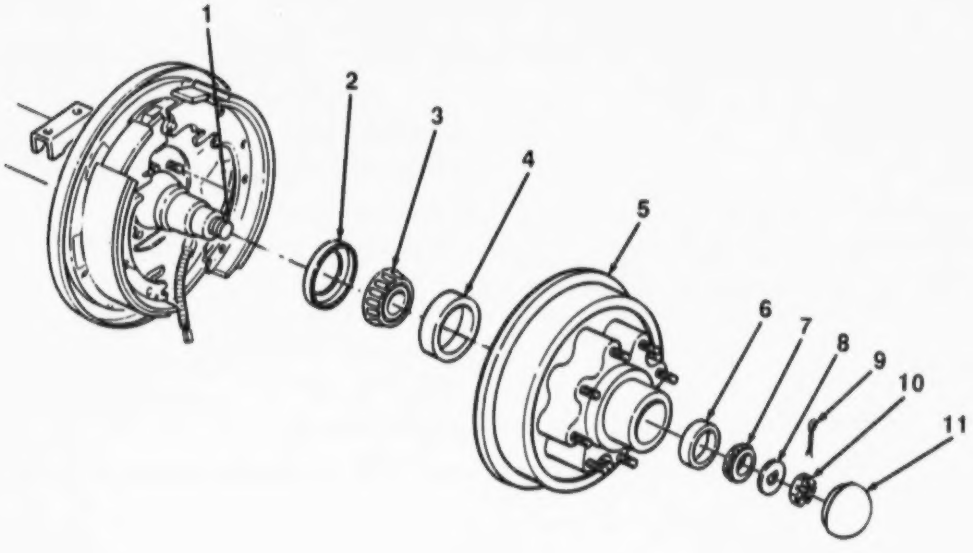
b. INSPECTION

1. Inspect inner and outer bearings (3 and 7) and cups (4 and 6) for rust or pits. Replace if defective.
2. Inspect brakedrum (5) for signs of scoring or heat spots. Replace if defective.

c. INSTALLATION

1. Pack inner and outer bearings (3 and 7) (see LO 5-4310-452-12).
2. Install cup (6) in brakedrum (5).
3. Install cup (4) in brakedrum (5).
4. Install inner bearing (3) and new grease seal (2) in brakedrum (5).
5. Install brakedrum (5) on spindle (1).
6. Install outer bearing (7), spindle washer (8), and castle nut (10) on spindle (1).
7. Loosen castle nut (10) about ¼-turn until hole is visible in spindle (1).
8. Install new cotter pin (9) and grease cap (11) on spindle (1).

4-66. TRAILER BRAKEDRUMS REPLACEMENT (Con't).



FOLLOW-ON TASKS:

- Install trailer tire (see paragraph 4-73).
- Adjust brakes (see paragraph 4-67).

4-67. TRAILER BRAKESHOES AND WHEEL CYLINDER REPLACEMENT.

This Task Covers:

a. Removal
b. Installation
c. Adjustment

Initial Setup:

Equipment Conditions:

- Engine off.
- Trailer parked on flat, level surface.
- Trailer tire removed (see paragraph 4-73).
- Trailer brakedrum removed (see paragraph 4-66).

Materials/Parts:

- Two self-locking screws

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Remove 2 springs (9) and guide plate (8) from backing plate (3).
2. Remove 2 hold-down springs (15) and 4 spring seats (14) by depressing hold-down springs and turning spring seats on pins (19).

NOTE

Perform step 3 if removing front brakeshoes only.

3. Remove strut (11) and spring (10) from slot in brakeshoes (7).
4. Remove 2 brakeshoes (7), spring (12), and brake adjuster socket (13) from backing plate (3).

NOTE

Perform steps 5 and 6 on front brakeshoes only.

5. Disconnect parking brake cable assembly (20) from lever (18) and remove cable from backing plate (3).
6. Remove retainer (16), lever (18), nut (17), and pin (6) from brakeshoes (7).
7. Disconnect brake line (1) from wheel cylinder assembly (5).
8. Remove 2 self-locking screws (2) from backing plate (3) and remove wheel cylinder assembly (5) and link (4). Discard self-locking screws.
9. Remove 5 nuts (21) and backing plate (3) from axle.

b. INSTALLATION

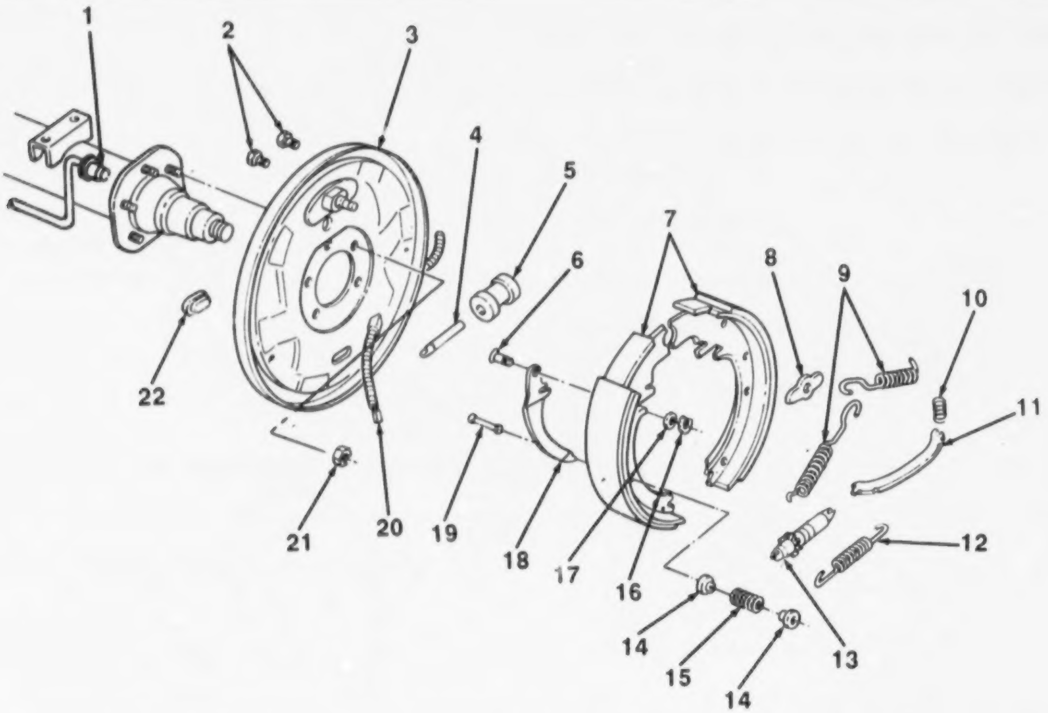
1. Install backing plate (3) on axle with 5 nuts (21).
2. Position wheel cylinder assembly (5) and link (4) in place on backing plate (3) and install 2 new self-locking screws (2).
3. Connect brake line (1) to wheel cylinder assembly (5).

NOTE

Perform steps 4 and 5 for front brakeshoes only.

4. Install lever (18), pin (19) with nut (17), retainer (16), and pin (6) on longer brakeshoe (7).

4-67. TRAILER BRAKESHOES AND WHEEL CYLINDER REPLACEMENT (Con't).



5. Install parking brake cable assembly (20) in backing plate (3) and connect to lever (18).

NOTE

Perform step 6 if removing front brakeshoes only.

6. Install brake adjuster socket (13), spring (12), and 2 brakeshoes (7), with longer brakeshoe to the rear, on backing plate (3).
7. Install strut (11) and spring (10) in slot of brakeshoes (7).
8. Position 4 spring seats (14) and 2 springs (15) on brakeshoes (7). Install 2 pins (19) in springs (15) from back side of brakeshoes.
9. Install guide plate (8) and 2 springs (9) on backing plate (3).
10. Install trailer brakedrums (see paragraph 4-66).
11. Bleed brakes if necessary.

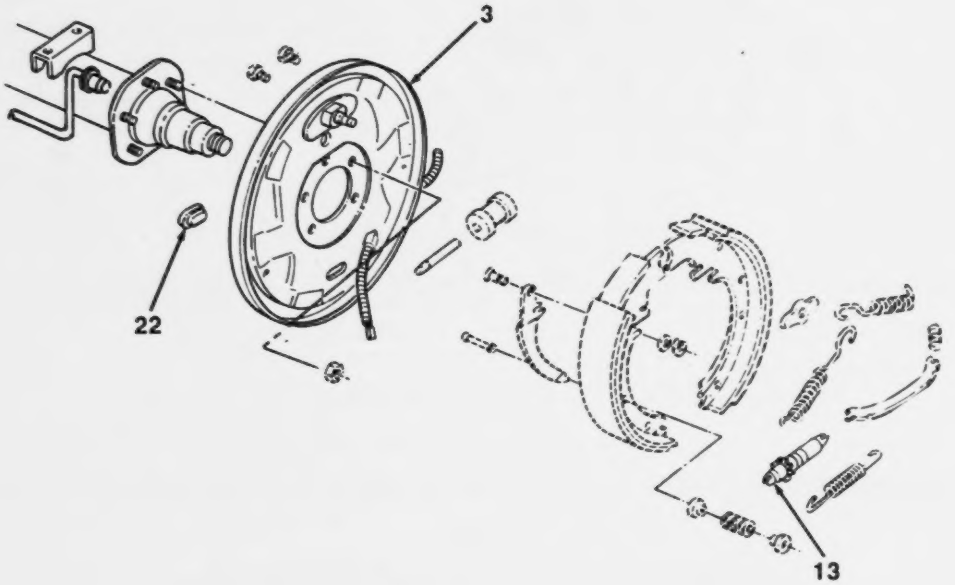
c. ADJUSTMENT

1. Remove adjuster cover (22) from backing plate (3).
2. Turn brake adjuster socket (13) until brakeshoes expand against drum and heavy drag is felt when wheel is spun.

TA505507

4-67. TRAILER BRAKESHOES AND WHEEL CYLINDER REPLACEMENT (Con't).

3. Back off brake adjuster socket (13) 12 "clicks."
4. Install adjuster cover (22) in backing plate (3).
5. Install trailer tire (see paragraph 4-73).



TA505508

4-68. AIR CHAMBER REPLACEMENT.

This Task Covers:

a. Removal b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Trailer parked on flat, level surface.
- Parking brake set.

Materials/Parts:

- Two lockwashers

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

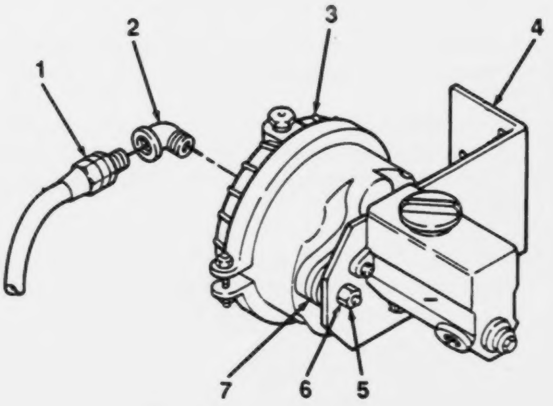
1. Disconnect hose assembly (1) from elbow (2). Remove elbow from air chamber (3).
2. Remove 2 nuts (5), lockwashers (6), and air chamber (3) from bracket (4). Discard lockwashers.
3. Remove shims (7) from air chamber (3).

b. INSTALLATION

NOTE

When installing air chamber, ensure that thickness of shims is equal to 0.56 ± 0.03 in. (14.2 ± 0.7 mm).

1. Install shims (7) on air chamber (3).
2. Position air chamber (3) on bracket (4) and install 2 nuts (5) and new lockwashers (6).
3. Install elbow (2) in air chamber (3).
4. Connect hose assembly (1) to elbow (2).



TA505509

4-69. MASTER CYLINDER RESERVOIR REPLACEMENT.

This Task Covers:

a. Removal b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Trailer parked on flat, level surface.
- Parking brake set.
- Air chamber removed (see paragraph 4-68).

Tools/Test Equipment:

- General mechanic's tool kit
- Suitable container

Materials/Parts:

- Brake fluid (Item 2, Appendix E)
- One copper washer
- Three lockwashers
- Three self-locking nuts

References:

- LO 5-4310-452-12

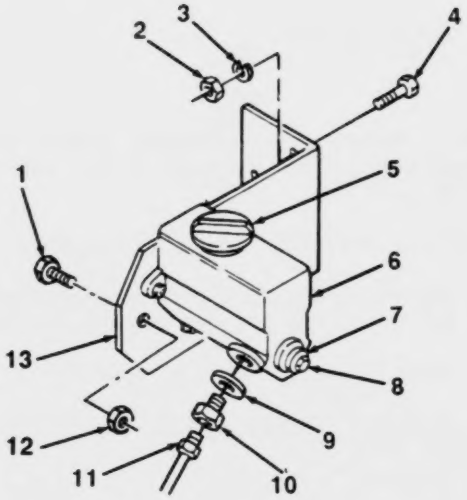
a. REMOVAL

1. Loosen cap (5). Place suitable container under master cylinder reservoir (6).
2. Remove drain plug (8) and gasket (7) and drain master cylinder reservoir (6).
3. Disconnect brake line (11) from reducer (10). Remove reducer and copper washer (9) from master cylinder reservoir (6). Discard copper washer.
4. Remove 3 screws (1), self-locking nuts (12), and master cylinder reservoir (6) from bracket (13). Discard self-locking nuts.

NOTE

If bracket is damaged, perform step 5.

5. Remove 3 capscrews (4), lockwashers (3), nuts (2), and bracket (13) from frame. Discard lockwashers.



b. INSTALLATION

NOTE

If bracket was removed, perform step 1.

1. Position bracket (13) in place on frame and install 3 capscrews (4), new lockwashers (3), and nuts (2).
2. Install master cylinder reservoir (6) in place on bracket (13) with 3 screws (1) and new self-locking nuts (12).

TA505510

4-69. MASTER CYLINDER RESERVOIR REPLACEMENT (Con't).

3. Install reducer (10) and new copper washer (9) in master cylinder reservoir (6). Connect brake line (11) to reducer.

4. Install drain plug (8) and gasket (7) in master cylinder reservoir (6).

5. Fill master cylinder reservoir (6) with brake fluid (see LO 5-4310-452-12).

6. Tighten cap (5).

FOLLOW-ON TASKS:

- Install air chamber (see paragraph 4-68).
- Bleed brake system.

4-70. RELAY VALVE REPLACEMENT.

This Task Covers:

a. Removal	b. Installation

Initial Setup:

Equipment Conditions:

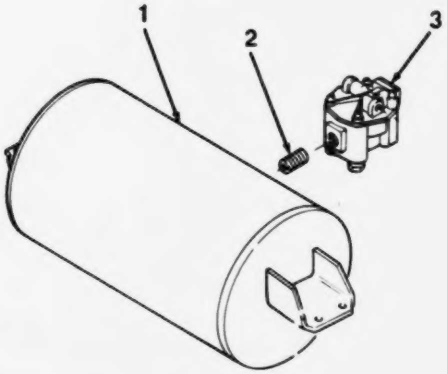
- Engine off.
- Trailer parked on flat, level surface.
- Parking brake set.
- Hoses, lines, and fittings from relay valve removed (see paragraph 4-72).

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Remove relay valve (3) from nipple (2).
2. Remove nipple (2) from reservoir (1).



b. INSTALLATION

1. Install nipple (2) in reservoir (1).
2. Install relay valve (3) onto nipple (2).

FOLLOW-ON TASKS:

- Connect fittings, lines, and hoses to relay valve (see paragraph 4-72).

TA505511

4-71. RESERVOIR MAINTENANCE.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Trailer parked on flat, level surface.
- Parking brake set.
- Relay valve removed (see paragraph 4-70).

Materials/Parts:

- Four lockwashers

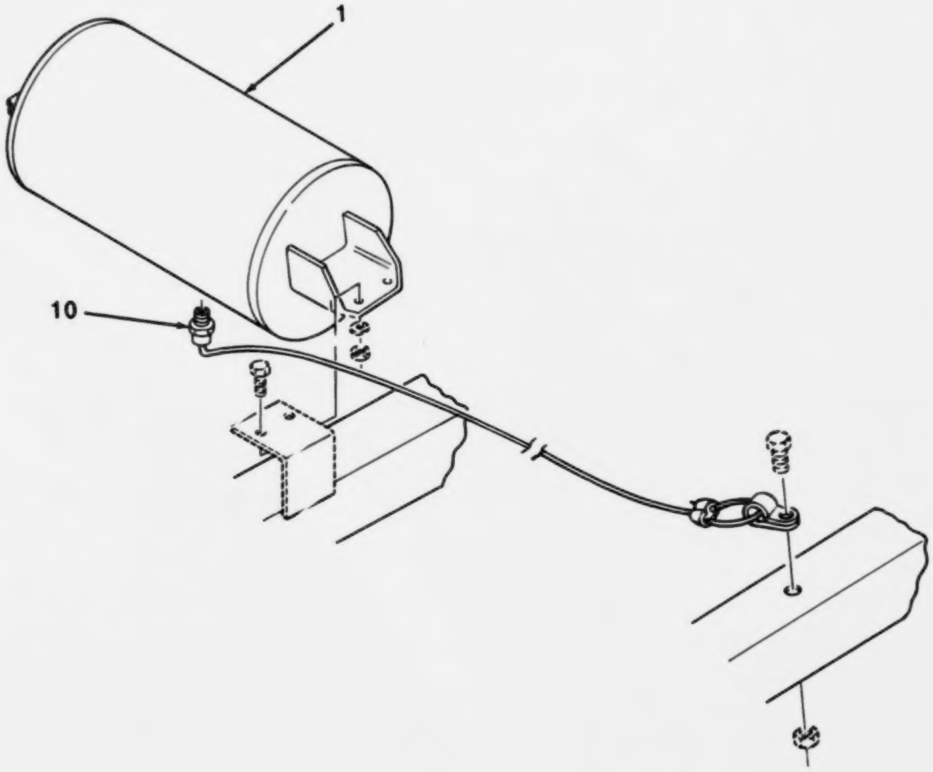
Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

MOISTURE DRAIN VALVE

1. Remove moisture drain valve (10) from bottom of reservoir (1).



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4-71. RESERVOIR MAINTENANCE (Con't).

2. Remove screw (5), nut (7), and loop clamp (6) from frame. Remove control cable (4) from loop clamp.

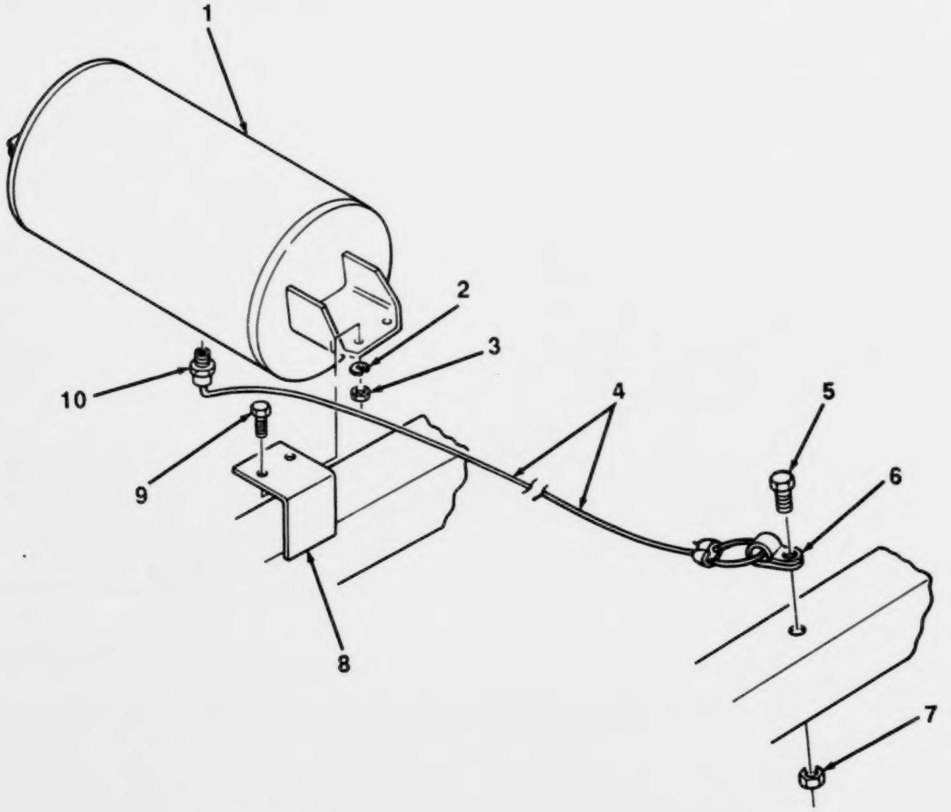
RESERVOIR

1. Remove 4 capscrews (9), lockwashers (2), and nuts (3) from reservoir (1) and mounting brackets (8). Discard lockwashers.
2. Remove reservoir (1) from mounting brackets (8).

b. INSTALLATION

RESERVOIR

1. Position reservoir (1) in place on mounting brackets (8).
2. Install 4 capscrews (9), new lockwashers (2), and nuts (3) in reservoir (1) and mounting brackets (8).



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4-71. RESERVOIR MAINTENANCE (Con't).

MOISTURE DRAIN VALVE

1. Install control cable (4) in loop clamp (6). Position loop clamp in place on frame and install screw (5) and nut (7).
2. Install moisture drain valve (10) in bottom of reservoir (1).

FOLLOW-ON TASKS:

- Install relay valve (see paragraph 4-70).

4-72. HOSES, LINES, AND FITTINGS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Trailer parked on flat, level surface.
- Parking brake set.
- System air pressure relieved.

Materials/Parts:

- Four self-locking screws
- Nine self-locking nuts

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

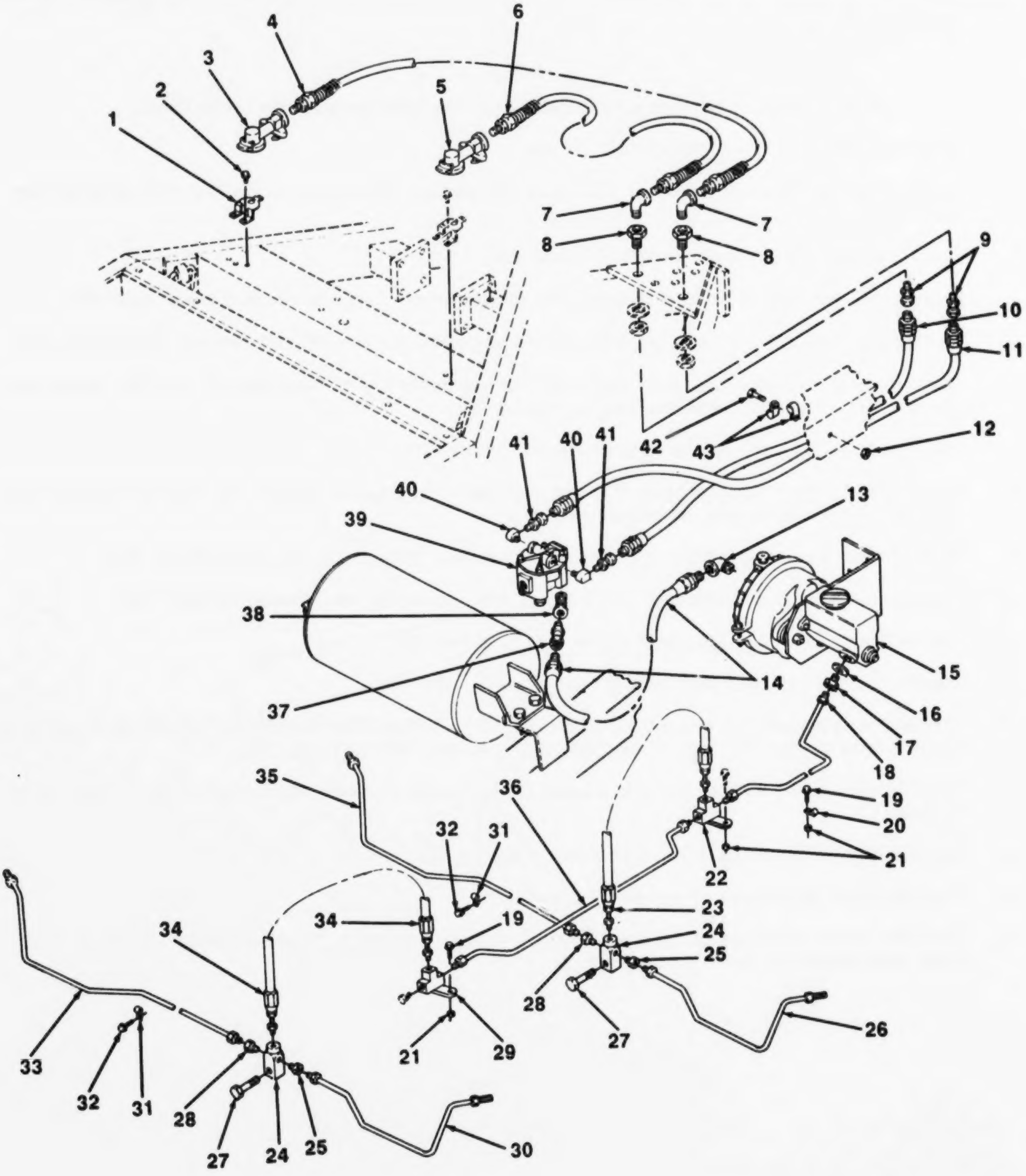
1. Remove service and emergency quick coupling halves (3 and 5) from hose assemblies (4 and 6).
2. Disconnect hose assemblies (4 and 6) from 2 elbows (7).
3. Disconnect hose assemblies (10 and 11) from swivels (9). Remove elbows (7) from adapters (8), and swivels from frame.
4. Disconnect hose assemblies (10 and 11) from swivels (41).
5. Remove 4 self-locking screws (42), nuts (12), and 8 loop clamps (43) from hose assemblies (10 and 11) and frame. Remove hose assemblies. Discard self-locking screws and nuts.
6. Remove 2 swivels (41) and pipe elbows (40) from relay valve (39).
7. Disconnect hose assembly (14) from swivel (37).
8. Remove swivel (37) and 2 elbows (13 and 38) from relay valve (39) and master cylinder (15).
9. Remove 4 screws (2) and 2 dummy couplings (1) from frame.
10. Remove 2 hose assemblies (23 and 34) from 2 tube tees (22 and 29) and tube elbows (24).
11. Disconnect brake line (18) from reducer (17) and tube tee (22). Remove 2 screws (19), self-locking nuts (21), loop clamps (20), and brake line (18) from frame. Discard self-locking nuts.
12. Remove reducer (17) and washer (16) from master cylinder (15).
13. Disconnect brake line (36) from tube tees (22 and 29). Remove 3 screws (19), self-locking nuts (21), loop clamp (20), and brake line. Discard self-locking nuts.

NOTE

Perform steps 14 through 17 to remove either the front or rear axle brake lines.

14. Remove brake line (26 or 30) and reducer (25) from tube elbow (24) and wheel cylinder assembly.
15. Remove 3 screws (32) from loop clamps (31).
16. Remove brake line (35 or 33), reducer (28), and loop clamps (31) from tube elbow (24) and wheel cylinder assembly.
17. Remove screw (27) and tube elbow (24) from axle.

4-72. HOSES, LINES, AND FITTINGS REPLACEMENT (Con't).



TA505514

4-72. HOSES, LINES, AND FITTINGS REPLACEMENT (Con't).

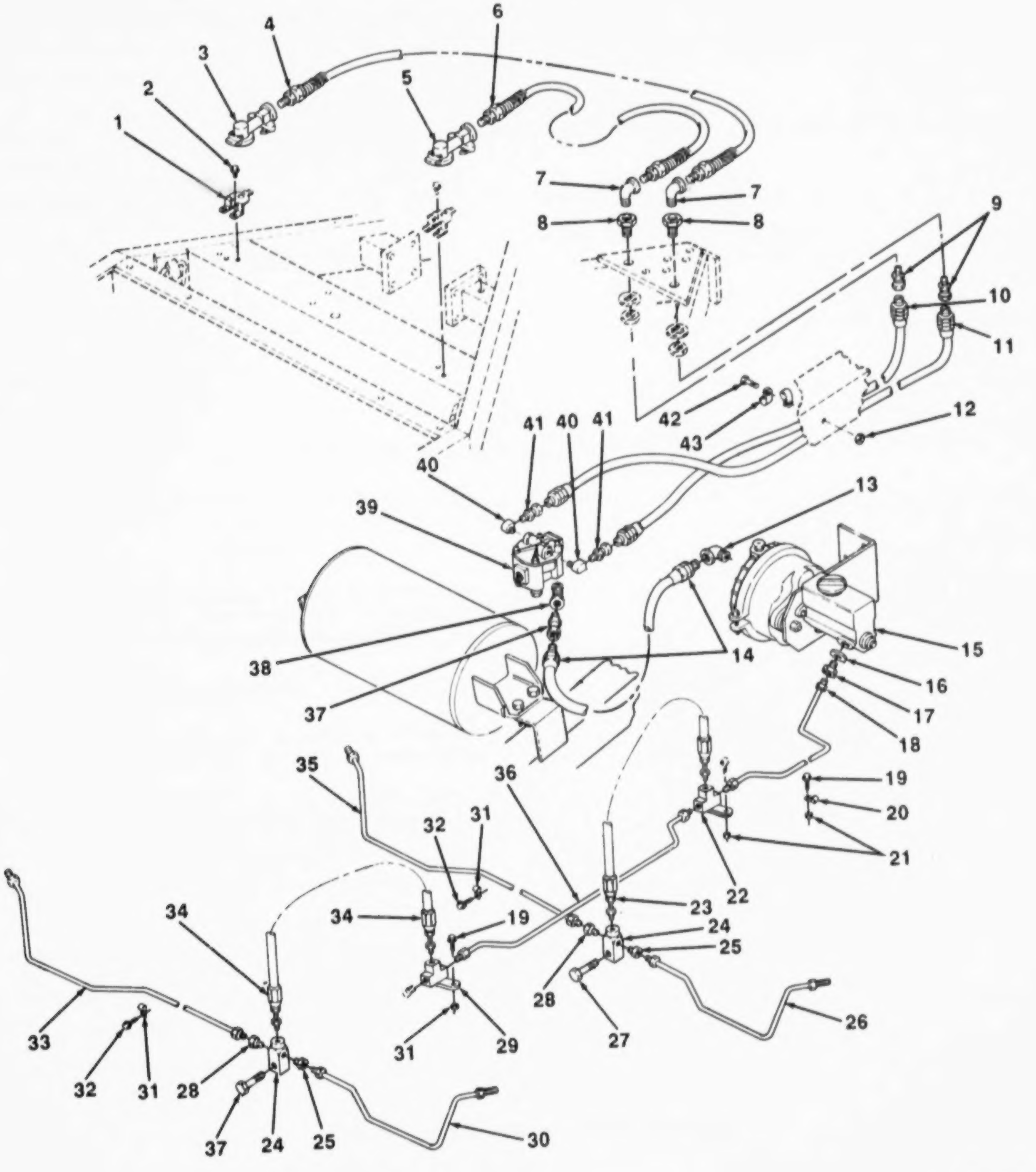
b. INSTALLATION

NOTE

Perform steps 1 through 4 to install either the front or rear axle brake lines.

1. Install tube elbow (24) and screw (27) on axle.
2. Install brake line (35 or 33), reducer (28), and loop clamps (31) to tube elbow (24) and wheel cylinder assembly.
3. Install 3 screws (32) in loop clamps (31) and axle.
4. Install brake line (26 or 30) and reducer (25) to tube elbow (24) and wheel cylinder assembly.
5. Position tube tees (22 and 29) in place on frame and install 2 screws (19) and new self-locking nuts (21).
6. Position brake line (36) in place on frame and connect brake line to tube tees (22 and 29). Install loop clamp (20), screw (19), and new self-locking nut (21).
7. Install reducer (17) and washer (16) in master cylinder (15).
8. Connect brake line (18) to reducer (17) and tube tee (22). Install 2 screws (19), new self-locking nuts (21), and loop clamps (20) on brake line (18).
9. Install 2 hose assemblies (23 and 34) from 2 tube tees (22 and 29) and tube elbows (24).
10. Install swivel (37) and 2 elbows (13 and 38) in relay valve (39) and master cylinder (15).
11. Connect hose assembly (14) from elbow (13) to swivel (37).
12. Install 2 swivels (41) and pipe elbows (40) on relay valve (39).
13. Connect hose assemblies (10 and 11) to swivels (41). Position hose assemblies in place on frame and install 8 loop clamps (43) with 4 new self-locking screws (42) and nuts (12).
14. Install adapters (8), swivels (9), and elbows (7) on frame. Connect hose assemblies (10 and 11) to swivels.
15. Install 2 dummy couplings (1) to frame with 4 screws (2).
16. Connect hose assemblies (4 and 6) to elbows (7).
17. Connect service and emergency quick coupling halves (3 and 5) to hose assemblies (4 and 6). Install hose assemblies in 2 dummy couplings (1).

4-72. HOSES, LINES, AND FITTINGS REPLACEMENT (Con't).



TA505515

Section XI. WHEELS AND HUBS MAINTENANCE

4-73. TRAILER TIRE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Trailer parked on flat, level surface.
- Parking brake set.
- Trailer wheels chocked.

Tools/Test Equipment:

- General mechanic's tool kit
- Jack, 10,000 lb. capacity

a. REMOVAL

NOTE

Use this task to replace any one of 4 trailer tires.

1. Loosen 8 lug nuts (1) on wheel (2) 1 turn.

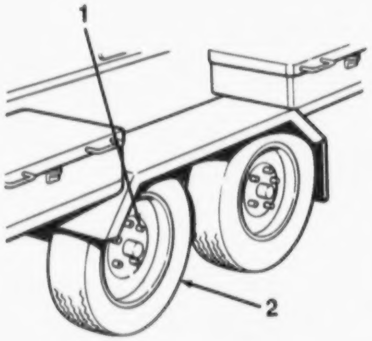
WARNING

Ensure that compressor unit is securely supported before removing tire. Compressor unit weighs 7,000 pounds and can crush you.

CAUTION

Place jack under axle as close to wheel assembly as possible to prevent damage to axle.

2. Using a jack, raise and block compressor unit off ground.
3. Remove 8 lug nuts (1) and tire (2).
4. To repair tire, see TM 9-2610-200-14.



b. INSTALLATION

1. Install tire (2) and 8 lug nuts (1).
2. Remove blocks, lower compressor unit to ground, and remove jack.

NOTE

Ensure that lug nuts are tightened evenly.

3. Tighten lug nuts (1) in a crisscross star pattern.

TA505516

Section XII. FRAME AND TOWING ASSEMBLY MAINTENANCE

Paragraph Number	Title	Page Number
4-74	Drawbar Replacement	4-147
4-75	Spare Tire Mount Replacement	4-148
4-76	Mudflap Replacement	4-149
4-77	Leveling Jack Replacement	4-150

4-74. DRAWBAR REPLACEMENT.

This Task Co.

a. Removal
b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.

Tools/Test Equipment:

- General mechanic's tool kit
- Torque wrench
- Common number 2, less power

Materials/Parts:

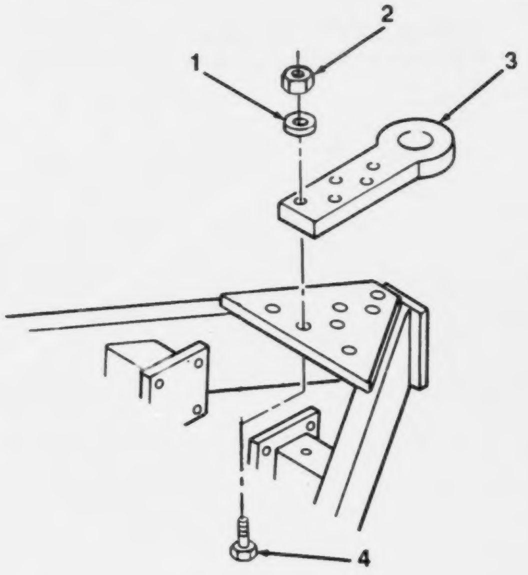
- Five self-locking nuts

a. REMOVAL

1. Remove 5 capscrews (4), washers (1), and self-locking nuts (2) from drawbar (3) and frame. Discard self-locking nuts.
2. Remove drawbar (3) from frame.

b. INSTALLATION

1. Position drawbar (3) in place on frame and install 5 capscrews (4), washers (1), and new self-locking nuts (2).
2. Tighten capscrews (4) and self-locking nuts (2) to 180-200 lb.-ft. (244-271 N•m).



TA505517

4-75. SPARE TIRE MOUNT REPLACEMENT.

This Task Covers:

a. Removal　　b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

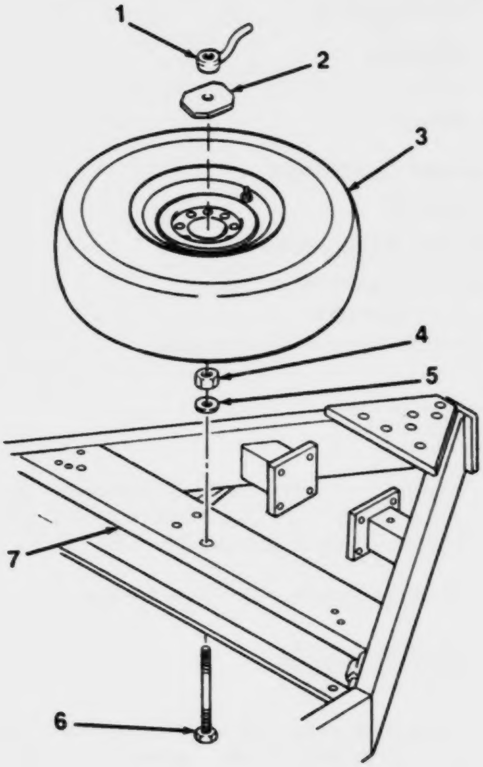
- One lockwasher

a. REMOVAL

1. Remove lever (1), plate (2), and spare tire (3) from machine bolt (6).
2. Remove nut (4), lockwasher (5), and machine bolt (6) from frame crossmember (7). Discard lockwasher.

b. INSTALLATION

1. Install machine bolt (6), new lockwasher (5), and nut (4) in frame crossmember (7).
2. Install spare tire (3), plate (2), and lever (1) on machine bolt (6) and frame crossmember (7).



TA505518

4-76. MUDFLAP REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

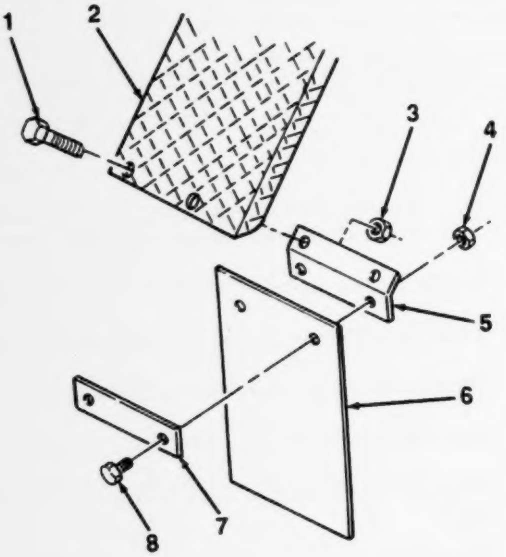
- Four self-locking nuts

a. REMOVAL

1. Remove 2 self-locking nuts (4), capscrews (8), plate (7), and mudflap (6) from bracket (5). Discard self-locking nuts.
2. Remove 2 self-locking nuts (3), capscrews (1), and bracket (5) from fender (2). Discard self-locking nuts.

b. INSTALLATION

1. Position bracket (5) in place on fender (2). Install 2 capscrews (1) and new self-locking nuts (3).
2. Position mudflap (6) and plate (7) in place on bracket (5). Install 2 capscrews (8) and new self-locking nuts (4).



TA505519

4-77. LEVELING JACK REPLACEMENT.

This Task Covers:

a. Removal of Front Leveling Jack
b. Installation of Front Leveling Jack
c. Removal of Left or Right Rear Leveling Jack
d. Installation of Left or Right Rear Leveling Jack

Initial Setup:

Equipment Conditions:

- Engine off.
- Trailer parked on flat, level surface.
- Parking brake set.
- Trailer wheels chocked.

Materials/Parts:

- Eight self-locking nuts

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL OF FRONT LEVELING JACK

WARNING

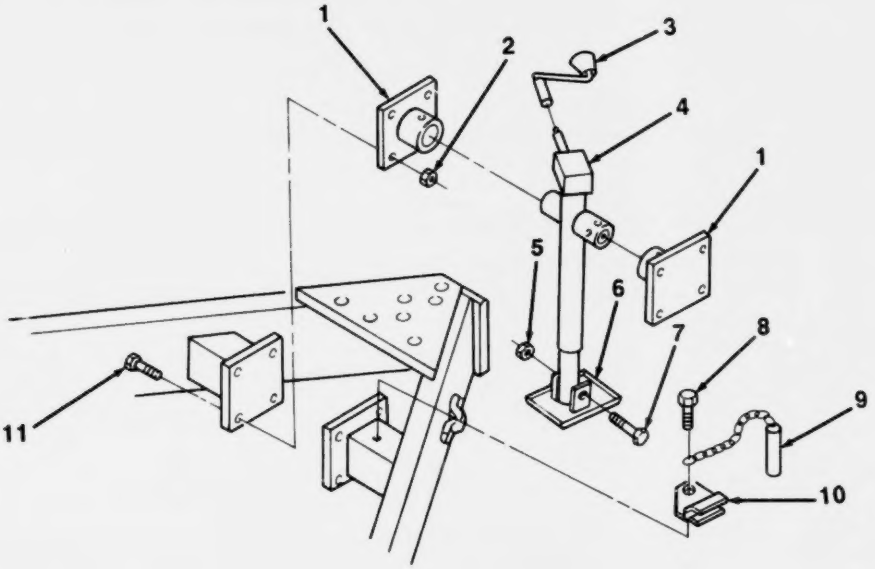
Ensure that compressor unit is securely supported before removing front leveling jack. Compressor unit weighs 7,000 pounds and can crush you.

1. Using blocks, support compressor unit under front of frame.
2. Using handcrank (3), lower compressor unit onto suitable support.
3. Remove 8 capscrews (11) and self-locking nuts (2) from 2 trunnion mounts (1). Discard self-locking nuts.
4. Remove capscrew (8), bracket (10), and locking pin (9) from frame.
5. Remove leveling jack (4) and trunnion mounts (1) from frame. Remove trunnion mounts from leveling jack.
6. Remove capscrew (7), nut (5), and jack support shoe (6) from leveling jack (4).

b. INSTALLATION OF FRONT LEVELING JACK

1. Install jack support shoe (6) on leveling jack (4) with capscrew (7) and nut (5).
2. Install trunnion mounts (1) on leveling jack (4).
3. Position leveling jack (4) and trunnion mounts (1) in place on frame.
4. Install 8 capscrews (11) and new self-locking nuts (2) in 2 trunnion mounts (1) and frame.
5. Install capscrew (8), bracket (10), and locking pin (9) on frame.
6. Using handcrank (3), raise compressor unit and remove support.

4-77. LEVELING JACK REPLACEMENT (Con't).



c. REMOVAL OF LEFT OR RIGHT REAR LEVELING JACK

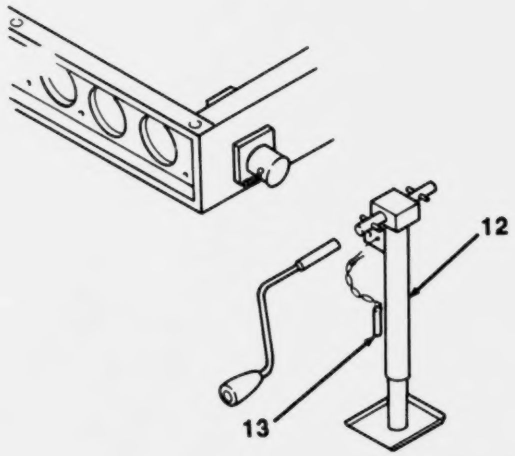
NOTE

Perform this task to remove either the left or right rear leveling jack. Right rear leveling jack is shown.

1. Remove quick release pin (13) from leveling jack (12). Remove leveling jack and quick release pin from frame.

d. INSTALLATION OF LEFT OR RIGHT REAR LEVELING JACK

1. Position leveling jack (12) in place on frame.
2. Install quick release pin (13) in leveling jack (12).



TA505520

Section XIII. SUSPENSION MAINTENANCE

4-78. SHOCK ABSORBER REPLACEMENT.

This Task Covers:

a. Removal
b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Trailer parked on flat, level surface.
- Parking brake set.

Tools/Test Equipment:

- Jack, 10,000 lb capacity
- General mechanic's tool kit

a. REMOVAL

WARNING

Ensure that compressor unit is securely supported on blocks before working under it. Compressor unit weighs 7,000 pounds and can crush you. DO NOT use the jack to support the trailer while you work.

4-78. SHOCK ABSORBER REPLACEMENT (Con't).

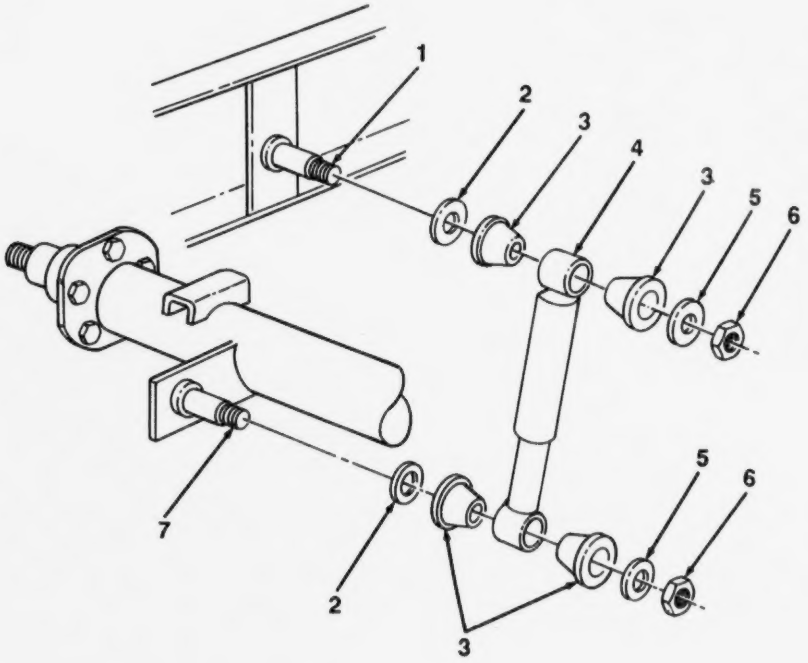
CAUTION

Place jack under axle as close to the wheel drum as possible to prevent damage to the axle.

1. Using jack, raise trailer until weight is off axle on side of trailer where shock absorber (4) is to be removed.
2. Support work side of trailer with blocks, then lower jack until trailer rests on blocks.
3. Remove 2 nuts (6), flatwashers (5), rubber bushings (3), shock absorber (4), and flatwashers (2) from axle stud (7) and frame stud (1).
4. Remove rubber bushings (3) from shock absorbers. Replace if necessary.

b. INSTALLATION

1. Position 2 flatwashers (2), shock absorber (4), 2 rubber bushings (3), flatwashers (5), and nuts (6) on axle stud (7) and frame stud (1).
2. Tighten nuts (6) to 45 lb.-ft. (61 N•m).
3. Raise jack until weight of trailer is off blocks. Remove blocks.
4. Lower jack until until trailer is resting on the ground. Remove jack.



TA505521

Section XIV. BODY MAINTENANCE

Paragraph Number	Title	Page Number
4-79	Tool Box Maintenance	4-155
4-80	Tool Box Pad Replacement	4-160
4-81	Data Plates, Decals, and Instruction Holders Replacement	4-161
4-82	Front End Panel Assembly Replacement	4-163

4-79. TOOL BOX MAINTENANCE.

This Task Covers:

a. Removal of Tool Box
b. Disassembly of Tool Box
c. Assembly of Tool Box
d. Installation of Tool Box
e. Removal of Drill Rod Box
f. Disassembly of Drill Rod Box
g. Assembly of Drill Rod Box
h. Installation of Drill Rod Box

Initial Setup:

Equipment Conditions:

- Engine off.
- Tool box or drill rod box emptied of contents.
- Marker lights removed (see paragraph 4-58).

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- Two self-locking nuts
- Three lockwashers

Personnel Required: Two

4-79. TOOL BOX MAINTENANCE (Con't).

a. REMOVAL OF TOOL BOX

NOTE

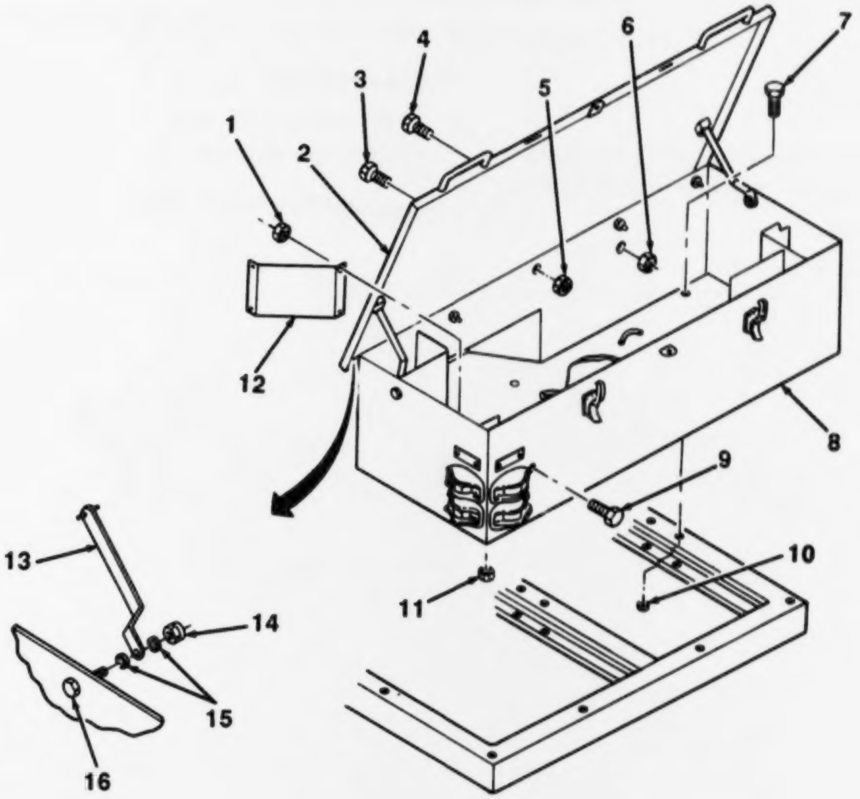
Use this task to replace any 1 of 4 tool boxes. Right front tool box is shown.

1. Remove 7 bolts (7) and nuts (10) from tool box (8) and frame.

NOTE

To remove left rear tool box, perform steps 2 and 4. To remove left front tool box, perform steps 3 and 4. To remove right front or right rear tool box, go to step 4.

2. Remove 3 screws (4) and nuts (6) from tool box (8) and drill rod box.
3. Remove 2 screws (4) and nuts (6) from tool box (8) and drill rod box.
4. Remove tool box (8) from frame.



TA505522

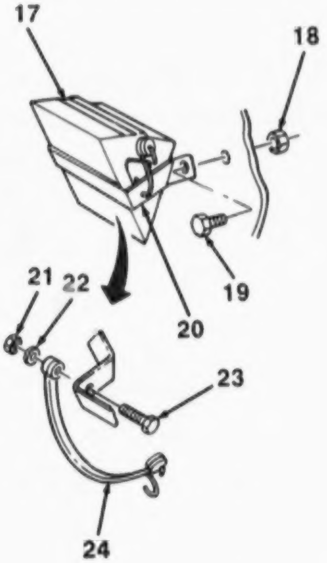
4-79. TOOL BOX MAINTENANCE (Con't).

b. DISASSEMBLY OF TOOL BOX

NOTE

- **To disassemble front tool boxes, begin with step 1.**
- **To disassemble rear tool boxes, go to step 3.**

1. Remove chock (17) from retaining strap (20). Remove 2 bolts (19), nuts (18), and retaining strap from tool box (8).
2. Remove screw (23), tie-down strap (24), washer (22), and nut (21) from retaining strap (20).
3. Remove 5 screws (3), nuts (5), and cover (2) from tool box (8).
4. Remove 4 screws (9), nuts (1), and light shield (12) from tool box (8).
5. Remove 2 capscrews (16), lid supports (13), self-locking nuts (14), and 4 spring washers (15) from tool box (8). Discard self-locking nuts.
6. Remove electrical bushing (11) from tool box (8).



c. ASSEMBLY OF TOOL BOX

1. Install electrical bushing (11) in tool box (8).
2. Install 2 lid supports (13), new self-locking nuts (14), and 4 spring washers (15) on capscrews (16) in tool box (8).
3. Install 4 screws (9), nuts (1), and light shield (12) in tool box (8).
4. Install 5 screws (3), nuts (5), and cover (2) on tool box (8).
5. Install screw (23), nut (21), washer (22), and tie-down strap (24) on retaining strap (20).
6. Position retaining strap (20) in place on tool box (8) and install 2 bolts (19) and nuts (18). Install chock in retaining strap and secure with tie-down strap (24).

TA505523

4-79. TOOL BOX MAINTENANCE (Con't).

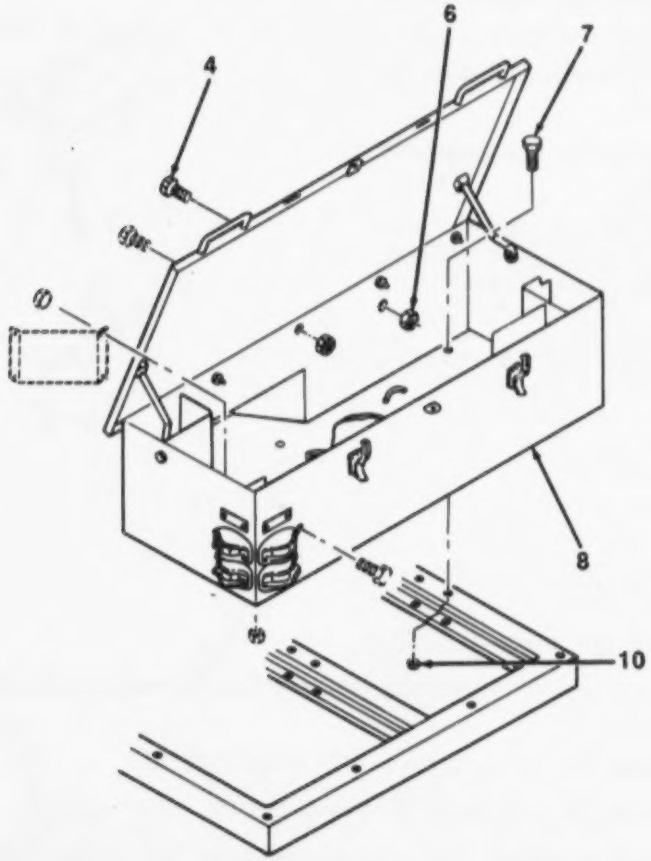
d. INSTALLATION OF TOOL BOX

1. Position tool box (8) in place on frame.

NOTE

To install left rear tool box, perform steps 2 and 4. To install left front tool box, perform steps 3 and 4. To install right front or rear tool box, go to step 4.

2. Install 3 screws (4) and nuts (6) in tool box (8) and drill rod storage box.
3. Install 2 screws (4) and nuts (6) in tool box (8) and drill rod storage box.
4. Install 7 bolts (7) and nuts (10) in tool box (8) and frame.



e. REMOVAL OF DRILL ROD BOX

1. Remove 2 bolts (25) and nuts (29) from left front tool box and drill rod box (27).
2. Remove 3 bolts (25) and nuts (29) from left rear tool box and drill rod box (27).
3. Remove 3 bolts (40) and nuts (39) from drill rod box (27) and frame.

TA505524

4-79. TOOL BOX MAINTENANCE (Con't).

4. Remove drill rod box (27) from frame.
5. Remove screw (41), nut (35), and mending plate (34) from left rear tool box.

f. DISASSEMBLY OF DRILL ROD BOX

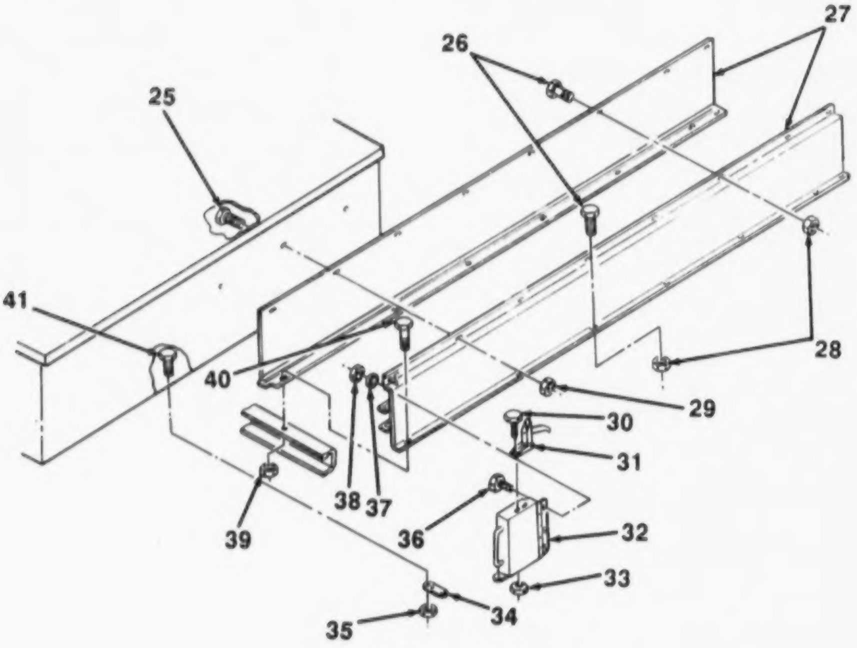
1. Remove 7 screws (26) and nuts (28) from drill rod box (27). Separate drill rod storage box.
2. Remove 3 screws (36), nuts (38), and lockwashers (37) from drill rod box (27) and cover (32). Remove cover and discard lockwashers.
3. Remove 2 screws (30), nuts (33), and clamping catch (31) from drill rod box (27).

g. ASSEMBLY OF DRILL ROD BOX

1. Install 2 screws (30), nuts (33), and clamping catch (31) on drill rod box (27).
2. Install 3 screws (36), nuts (38), new lockwashers (37), and cover (32) on drill rod box (27).
3. Position drill rod box (27) together and install 7 screws (26) and nuts (28).

h. INSTALLATION OF DRILL ROD BOX

1. Install screw (41), nut (35), and mending plate (34).
2. Position drill rod box (27) in place on frame.
3. Install 3 bolts (40) and nuts (39) in drill rod box (27) and frame.
4. Install 3 bolts (25) and nuts (29) in drill rod box (27) and left rear tool box.
5. Install 2 bolts (25) and nuts (29) in drill rod box (27) and left front tool box.



TA505525

4-80. TOOL BOX PAD REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- Tool box pad (as required)
- Plastic clips (as required)

a. REMOVAL

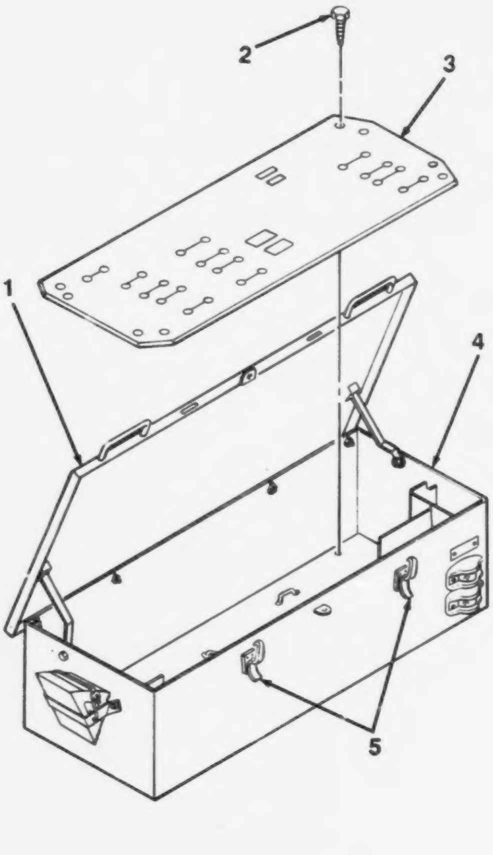
NOTE

Use this task to remove any 1 of 4 tool box pads. Right rear tool box pad is shown.

1. Release 2 clamping catches (5) on tool box (4) and open tool box lid (1).
2. Remove plastic clips (2) and tool box pad (3) from tool box (4). Discard tool box pad and plastic clips.

b. INSTALLATION

1. Install new tool box pad (3) and plastic clips (2) in tool box (4).
2. Close tool box lid (1) and latch 2 clamping catches (5).



TA505526

4-81. DATA PLATES, DECALS, AND INSTRUCTION HOLDERS REPLACEMENT.

This Task Covers:

a. Removal of Data Plates and Instruction Holders
b. Installation of Data Plates and Instruction Holders
c. Removal of Warranty Decal
d. Installation of Warranty Decal

Initial Setup:

Equipment Conditions:

- Engine off.

Tools/Test Equipment:

- General mechanic's tool kit
- Electric drill
- Rivet gun
- Twist drill bit

Materials/Parts:

- Drive screws (as required)
- Rivets (as required)

a. REMOVAL OF DATA PLATES AND INSTRUCTION HOLDERS

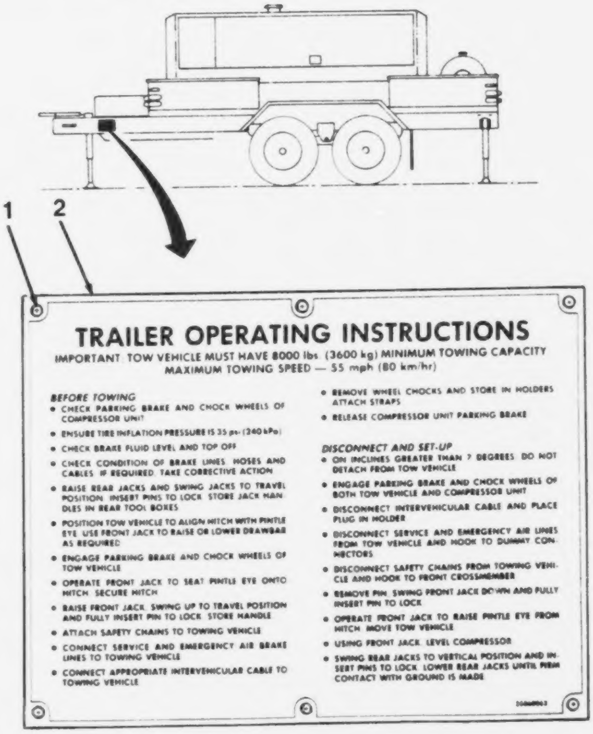
NOTE

Use this task to remove any 1 of 13 data plates and instruction holders. Trailer operating instructions data plate is shown.

1. Using electric drill and twist drill bit, remove rivets or drive screws (1) holding data plate (2) in place on compressor unit.
2. Remove data plate (2).

b. INSTALLATION OF DATA PLATES AND INSTRUCTION HOLDERS

1. Position data plate (2) in place on compressor unit.
2. Install rivets or drive screws (1) as required to hold data plate in place.



TRAILER OPERATING INSTRUCTIONS

IMPORTANT TOW VEHICLE MUST HAVE 8000 lbs (3600 kg) MINIMUM TOWING CAPACITY
MAXIMUM TOWING SPEED — 55 mph (80 km/hr)

BEFORE TOWING

- CHECK PARKING BRAKE AND CHOCK WHEELS OF COMPRESSOR UNIT
- ENSURE TIRE INFLATION PRESSURE IS 35 psi (240 kPa)
- CHECK BRAKE FLUID LEVEL AND TOP OFF
- CHECK CONDITION OF BRAKE LINES HOSES AND CABLES IF REQUIRED TAKE CORRECTIVE ACTION
- RAISE REAR JACKS AND SWING JACKS TO TRAVEL POSITION INSERT PINS TO LOCK STORE JACK HANDLES IN REAR TOOL BOXES
- POSITION TOW VEHICLE TO ALIGN HITCH WITH PINTLE EYE USE FRONT JACK TO RAISE OR LOWER DRAWBAR AS REQUIRED
- ENGAGE PARKING BRAKE AND CHOCK WHEELS OF TOW VEHICLE
- OPERATE FRONT JACK TO SEAT PINTLE EYE ONTO HITCH SECURE HITCH
- RAISE FRONT JACK SWING UP TO TRAVEL POSITION AND FULLY INSERT PIN TO LOCK STORE HANDLE
- ATTACH SAFETY CHAINS TO TOWING VEHICLE
- CONNECT SERVICE AND EMERGENCY AIR BRAKE LINES TO TOWING VEHICLE
- CONNECT APPROPRIATE INTERVEHICULAR CABLE TO TOWING VEHICLE
- REMOVE WHEEL CHOCKS AND STORE IN HOLDERS ATTACH STRAPS
- RELEASE COMPRESSOR UNIT PARKING BRAKE

DISCONNECT AND SET-UP

- ON INCLINES GREATER THAN 7 DEGREES DO NOT DETACH FROM TOW VEHICLE
- ENGAGE PARKING BRAKE AND CHOCK WHEELS OF BOTH TOW VEHICLE AND COMPRESSOR UNIT
- DISCONNECT INTERVEHICULAR CABLE AND PLACE PLUG IN HOLDER
- DISCONNECT SERVICE AND EMERGENCY AIR LINES FROM TOW VEHICLE AND HOOK TO DUMMY CONNECTORS
- DISCONNECT SAFETY CHAINS FROM TOWING VEHICLE AND HOOK TO FRONT CROSSMEMBER
- REMOVE PIN SWING FRONT JACK DOWN AND FULLY INSERT PIN TO LOCK
- OPERATE FRONT JACK TO RAISE PINTLE EYE FROM HITCH MOVE TOW VEHICLE
- USING FRONT JACK LEVEL COMPRESSOR
- SWING REAR JACKS TO VERTICAL POSITION AND INSERT PINS TO LOCK LOWER REAR JACKS UNTIL FIRM CONTACT WITH GROUND IS MADE

TA505527

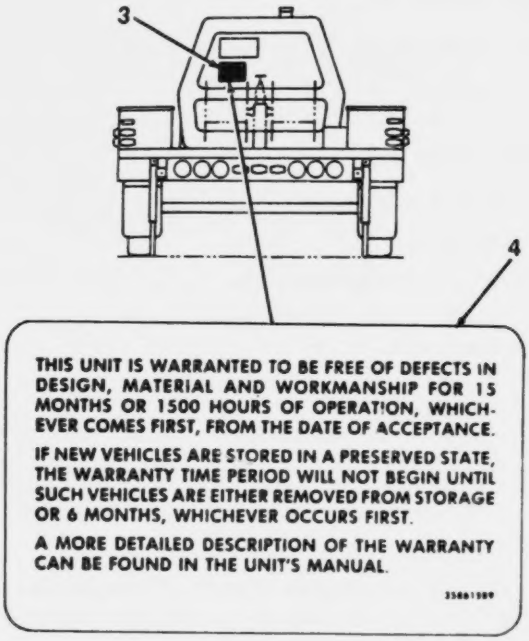
4-81. DATA PLATES, DECALS, AND INSTRUCTION HOLDERS REPLACEMENT (Con't).

c. REMOVAL OF WARRANTY DECAL

1. Open control panel access door (3).
2. Remove decal (4) from inside of control panel access door (3).

d. INSTALLATION OF WARRANTY DECAL

1. Peel off paper backing from new decal (4) and install on inside of control panel access door (3).
2. Close control panel access door (3).



THIS UNIT IS WARRANTED TO BE FREE OF DEFECTS IN DESIGN, MATERIAL AND WORKMANSHIP FOR 15 MONTHS OR 1500 HOURS OF OPERATION, WHICHEVER COMES FIRST, FROM THE DATE OF ACCEPTANCE.

IF NEW VEHICLES ARE STORED IN A PRESERVED STATE, THE WARRANTY TIME PERIOD WILL NOT BEGIN UNTIL SUCH VEHICLES ARE EITHER REMOVED FROM STORAGE OR 6 MONTHS, WHICHEVER OCCURS FIRST.

A MORE DETAILED DESCRIPTION OF THE WARRANTY CAN BE FOUND IN THE UNIT'S MANUAL.

TA505528

4-82. FRONT END PANEL ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Spare tire removed (see paragraph 4-75).

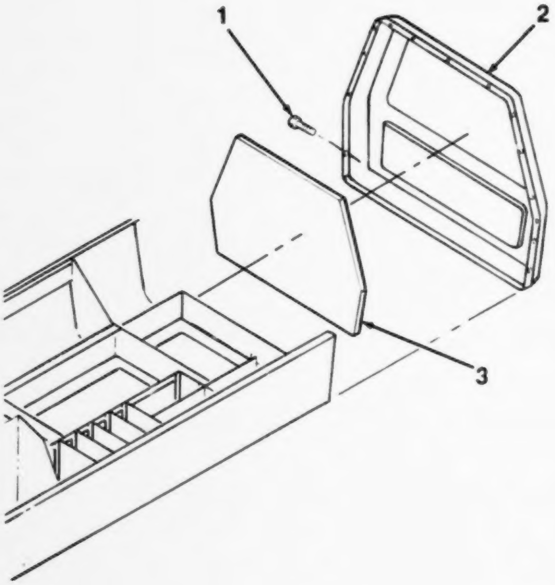
Tools/Test Equipment:

- General mechanic's tool kit

Personnel Required: Two

a. REMOVAL

1. Remove 21 screws (1) from front panel assembly (2).
2. Remove front end panel assembly (2) from trailer.
3. Inspect fiberglass panel (3) for rips or tears. If damaged, notify direct support maintenance.



b. INSTALLATION

1. Position front end panel assembly (2) in place on trailer.
2. Install 21 screws (1) in front end panel assembly (2).

FOLLOW-ON TASKS:

- Install spare tire (see paragraph 4-75).

TA505529

Section XV. COMPRESSOR MAINTENANCE

Paragraph Number	Title	Page Number
4-83	Compressor Assembly Test	4-165
4-84	Compressor Oil Filter Element Replacement	4-167
4-85	Compressor Oil Filter Assembly Replacement	4-168
4-86	Compressor Oil Lines, Hoses, and Fittings Replacement	4-170
4-87	Oil Separator Filter Element Replacement	4-174
4-88	Oil Separator Maintenance	4-176
4-89	Compressor Air Cleaner Assembly Replacement	4-180
4-90	Unloader Valve Assembly Replacement	4-182
4-91	Compressor Fan Belt Replacement	4-184
4-92	Compressor Fan and Fan Drive Maintenance	4-186
4-93	Moisture Filter/Separator Replacement	4-190
4-94	Regulating Valve Replacement	4-192
4-95	Blowdown Valve Replacement	4-194
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4-83. COMPRESSOR ASSEMBLY TEST.

THIS TASK COVERS

Testing

INITIAL SETUP

Equipment Conditions:

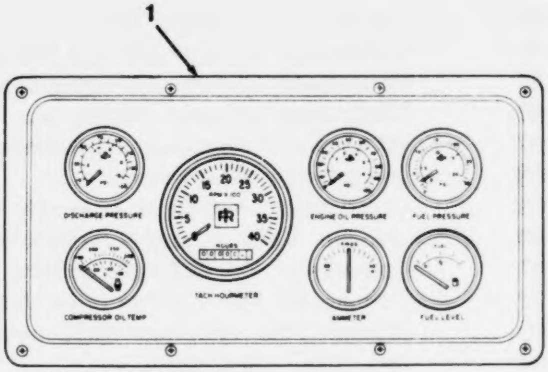
- Engine off.
- Compressor Assembly.

4-83. COMPRESSOR ASSEMBLY TEST (Con't).

TESTING

1. Start engine and run under varying loads for 2 hours (see paragraph 2-12). Monitor the gages on the indicator panel (1) during this period.

2. If the engine performance is normal and the load conditions are what you would normally expect, the compressor should discharge at 100 psi (689 kPa). If it doesn't, notify your supervisor.



TA505530

4-84. COMPRESSOR OIL FILTER ELEMENT REPLACEMENT.

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Air pressure relieved.
- Right door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- Lubricating oil (Item 9, Appendix E)
- One oil filter element

References:

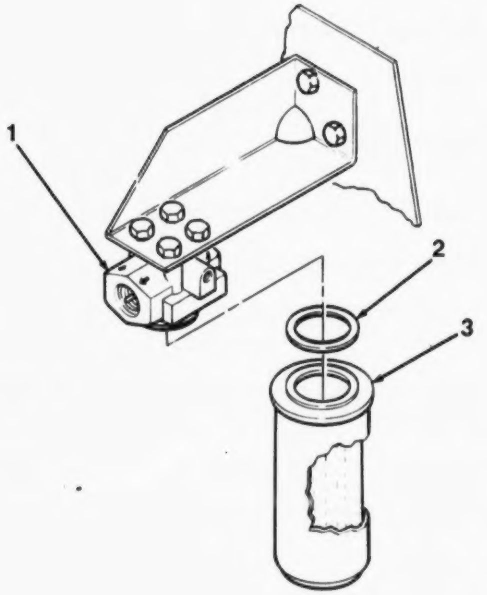
- LO 5-4310-452-12

a. REMOVAL

1. Remove compressor oil filter element (3) and gasket (2) from filter head (1). Discard oil filter element and gasket.

b. INSTALLATION

1. Apply a thin coat of lubricating oil on new gasket (2).
2. Install new oil filter element (3) and gasket (2) on filter head (1) until gasket contacts filter head, then tighten ¾-turn more.
3. Check compressor oil level in sight gage and fill if necessary (see LO 5-4310-452-12).
4. Start engine and check oil filter element (3) for leaks (see paragraph 2-12).



FOLLOW-ON TASKS:

- Close right door assembly.

TA505531

4-85. COMPRESSOR OIL FILTER ASSEMBLY REPLACEMENT.

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Right door assembly open.
- Compressor oil filter element removed (see paragraph 4-84).

Materials/Parts:

- Three preformed packings
- Four lockwashers

Tools/Test Equipment:

- General mechanic's tool kit

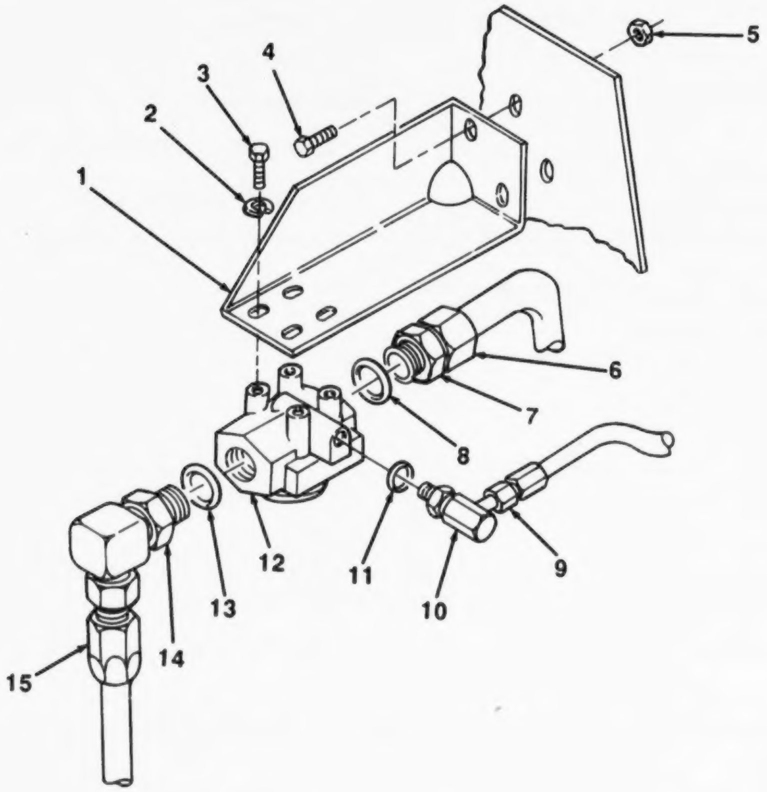
a. REMOVAL

1. Disconnect hose assembly (15) from elbow (14). Remove elbow and preformed packing (13) from filter head (12). Discard preformed packing.
2. Disconnect tube assembly (6) from adapter (7). Remove adapter and preformed packing (8) from filter head (12). Discard preformed packing.
3. Disconnect hose assembly (9) from elbow (10). Remove elbow and preformed packing (11) from filter head (12). Discard preformed packing.
4. Remove 4 capscrews (3), lockwashers (2), and filter head (12) from bracket (1). Discard lockwashers.
5. Remove 2 screws (4), nuts (5), and bracket (1) from rear wall baffle.

b. INSTALLATION

1. Install bracket (1) on rear wall baffle with 2 screws (4) and nuts (5).
2. Install filter head (12) on bracket (1) with 4 capscrews (3) and new lockwashers (2).
3. Install elbow (14) and new preformed packing (13) on filter head (12). Connect hose assembly (15) to elbow.
4. Install adapter (7) and new preformed packing (8) on filter head (12). Connect tube assembly (6) to adapter.
5. Install elbow (10) and new preformed packing (11) on filter head (12). Connect hose assembly (9) to elbow.

4-85. COMPRESSOR OIL FILTER ASSEMBLY REPLACEMENT (Con't).



FOLLOW-ON TASKS:

- Install compressor oil filter element (see paragraph 4-84).
- Close right door assembly.

TA505532

4-86. COMPRESSOR OIL LINES, HOSES, AND FITTINGS REPLACEMENT.

THIS TASK COVERS

a. Removal b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Access door assembly open.
- Compressor oil cooler drained (see LO 5-4310-452-12).
- Oil separator drained (see LO 5-4310-452-12).
- System air pressure relieved.

Materials/Parts:

- Five preformed packings

Tools/Test Equipment:

- General mechanic's tool kit

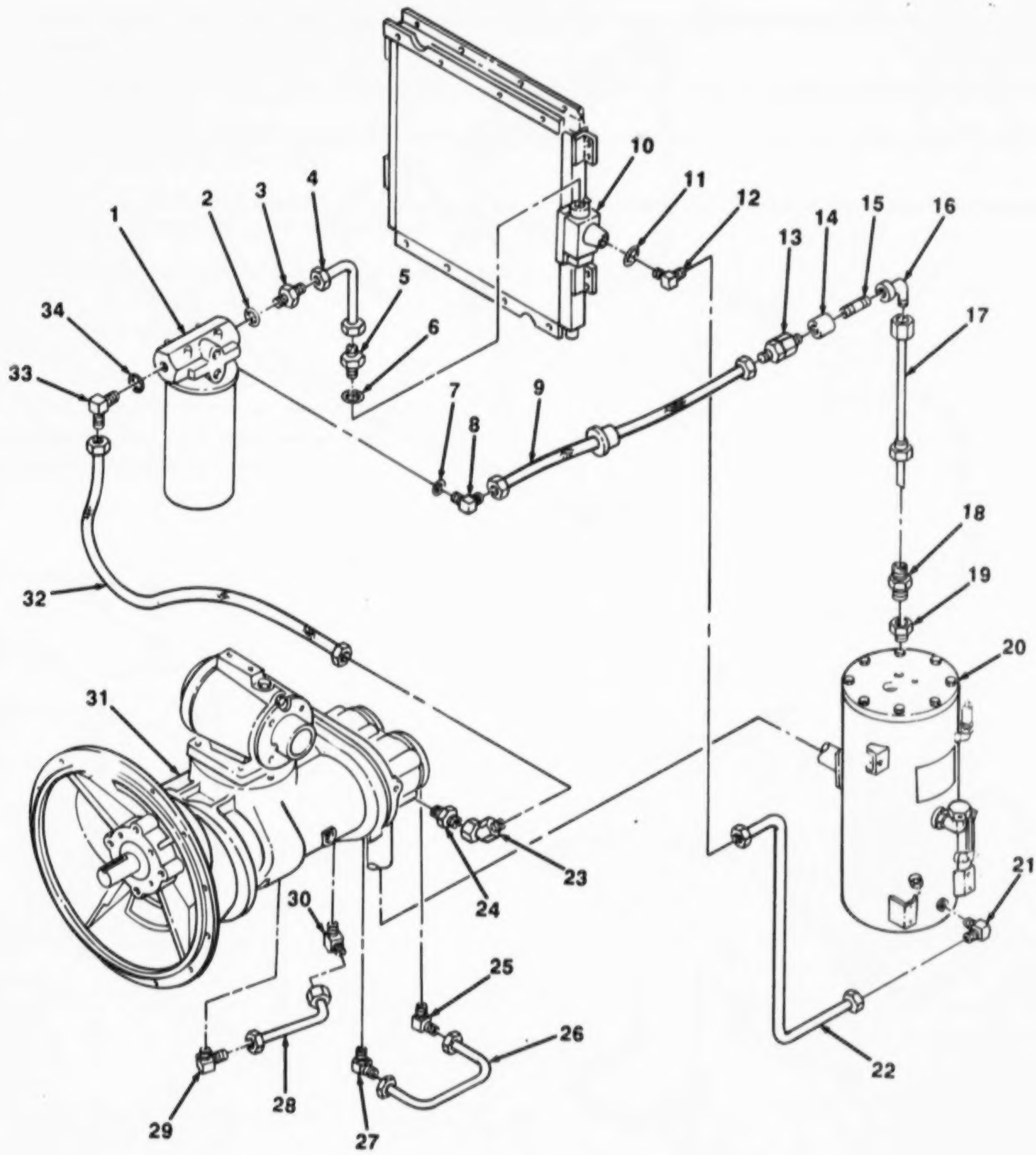
a. REMOVAL

1. Disconnect tube assembly (4) from 2 adapters (3 and 5). Remove adapter (3) and preformed packing (2) from oil filter assembly (1). Remove adapter (5) and preformed packing (6). Discard preformed packings.
2. Disconnect hose assembly (9) from elbow (8) and check valve (13). Remove elbow and preformed packing (7) from oil filter assembly (1). Discard preformed packing.
3. Remove check valve (13), pipe coupling (14), filter (15), and elbow (16) from scavage tube assembly (17).
4. Remove scavage tube assembly (17) from adapter (18). Remove adapter and pipe bushing (19) from oil separator (20).
5. Disconnect tube assembly (22) from elbows (12 and 21). Remove elbow (12) and preformed packing (11) from oil temperature bypass valve (10). Discard preformed packing.
6. Remove elbow (21) from oil separator (20).
7. Disconnect tube assembly (26) from elbows (25 and 27). Remove elbows from compressor (31).
8. Disconnect tube assembly (28) from elbows (29 and 30). Remove elbows from compressor (31).
9. Disconnect hose assembly (32) from elbows (23 and 33).
10. Remove elbow (23) from adapter (24). Remove adapter from compressor (31).
11. Remove elbow (33) and preformed packing (34) from oil filter assembly (1). Discard preformed packing.

b. INSTALLATION

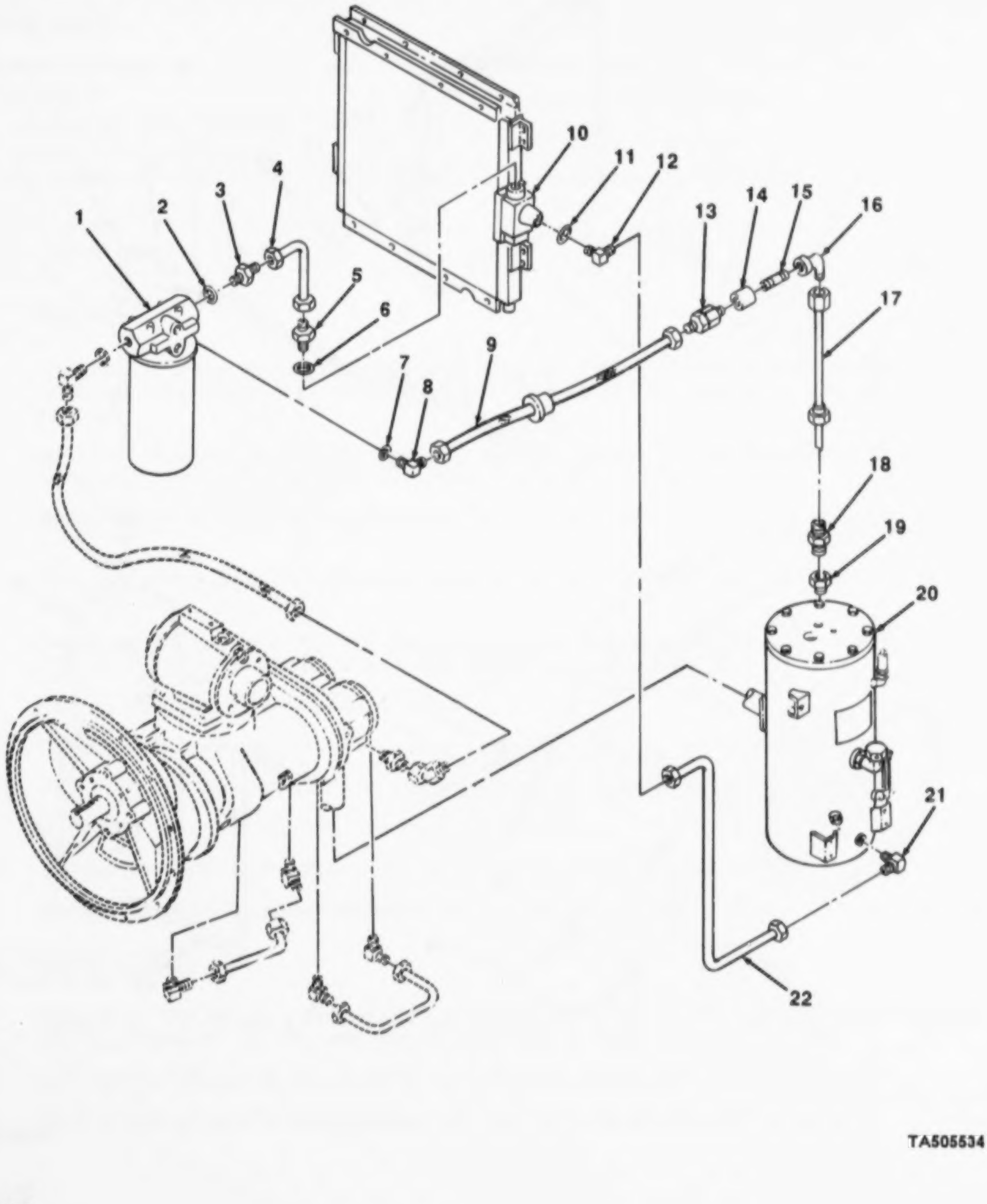
1. Install elbow (33) and new preformed packing (34) in oil filter assembly (1). Install adapter (24) and elbow (23) in compressor (31). Connect hose assembly (32) to elbows.
2. Install elbows (29 and 30) in compressor (31). Connect tube assembly (28) to elbows.
3. Install elbows (25 and 27) in compressor (31). Connect tube assembly (26) to elbows.

4-86. COMPRESSOR OIL LINES, HOSES, AND FITTINGS REPLACEMENT (Con't).



TA505533

4-86. COMPRESSOR OIL LINES, HOSES, AND FITTINGS REPLACEMENT (Con't).



TA505534

4-86. COMPRESSOR OIL LINES, HOSES, AND FITTINGS REPLACEMENT (Con't).

4. Install elbow (21) in oil separator (20). Install elbow (12) and new preformed packing (11) in oil temperature bypass valve (10). Connect tube assembly (22) to elbows.

5. Install pipe bushing (19) and adapter (18) in oil separator (20). Install scavage tube assembly (17) in adapter.

6. Install elbow (16), filter (15), pipe coupling (14), and check valve (13) on scavage tube assembly (17).

7. Install elbow (8) and new preformed packing (7) in oil filter assembly (1). Connect hose assembly (9) to elbow and check valve (13).

8. Install new preformed packing (2) and adapter (3) in oil filter assembly (1). Install new preformed packing (6) and adapter (5) in oil temperature bypass valve (10).

9. Connect tube assembly (4) to adapters (3 and 5).

FOLLOW-ON TASKS:

- Fill oil separator (see LO 5-4310-452-12).
- Fill compressor oil cooler (see LO 5-4310-452-12).
- Close left and right door assemblies.
- Close access door assembly.

4-87. OIL SEPARATOR FILTER ELEMENT REPLACEMENT.

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Access door assembly open.
- System pressure relieved.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

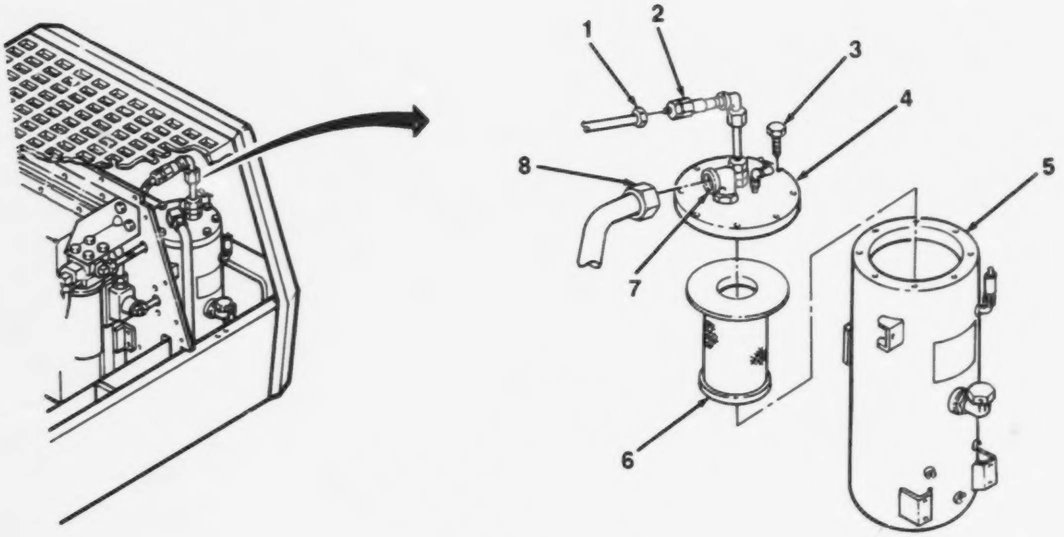
- One oil separator filter element

References:

- LO 5-4310-452-12

a. REMOVAL

1. Disconnect oil line (1) from check valve (2).
2. Disconnect discharge air tube (8) from elbow (7).
3. Loosen other end of discharge air tube (8) at manifold.
4. Remove 8 screws (3) and access cover (4) from oil separator (5).
5. Remove oil separator filter element (6) from oil separator (5). Discard oil separator filter element.



TA505535

4-87. OIL SEPARATOR FILTER ELEMENT REPLACEMENT (Con't).

b. INSTALLATION

1. Install new oil separator filter element (6) in oil separator (5).
2. Install access cover (4) and 8 screws (3) on oil separator (5). Tighten screws to 50 lb.-ft. (67.8 N•m) (see Appendix F for tightening sequence).
3. Connect discharge air tube (8) to elbow (7).
4. Tighten manifold end of discharge air tube (8).
5. Connect oil line (1) to check valve (2).
6. Check oil separator oil level. Add oil only if oil level is not visible in sight glass when engine is not running (see LO 5-4310-452-12).

FOLLOW-ON TASKS:

- Start engine and check for leaks (see paragraph 2-12).
- Close access door assembly.

4-88. OIL SEPARATOR MAINTENANCE.

THIS TASK COVERS

a. Removal
b. Disassembly
c. Assembly
d. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Access door assembly open.
- System pressure relieved.
- Check valve, filter, and scavage tube assembly removed (see paragraph 4-86).
- Safety relief valve removed (see paragraph 4-96).
- Air inlet hose removed (see paragraph 4-97).
- Oil separator filter element removed (see paragraph 4-87).
- Oil separator to temperature bypass valve tube removed (see paragraph 4-86).
- Manual blowdown valve removed (see paragraph 4-95).
- Front end panel assembly removed (see paragraph 4-82).

Materials/Parts:

- One lockwasher
- One self-locking nut
- One self-locking screw
- Two gaskets
- Two preformed packings
- Six self-locking bolts

Tools/Test Equipment:

- General mechanic's tool kit

Personnel Required: Two

a. REMOVAL

1. Remove drain valve (14), elbow (16), and nipple (15) from oil separator (4). Remove plug (13) from drain valve.
2. Disconnect both ends of air discharge tube (see paragraph 4-101). Remove elbow (1) and preformed packing (2) from oil separator cover (3). Discard preformed packing.
3. Remove nut (17), lockwasher (18), and electrical lead (19) from pressure transmitter (20). Discard lockwasher.
4. Remove 6 self-locking bolts (12) from oil separator (4) and frame. Discard self-locking bolts.
5. Remove self-locking screw (21) and nut (23) from bracket (22) and oil separator (4). Discard self-locking screw and nut.
6. Using a suitable lifting device, remove oil separator (4) from compressor unit.

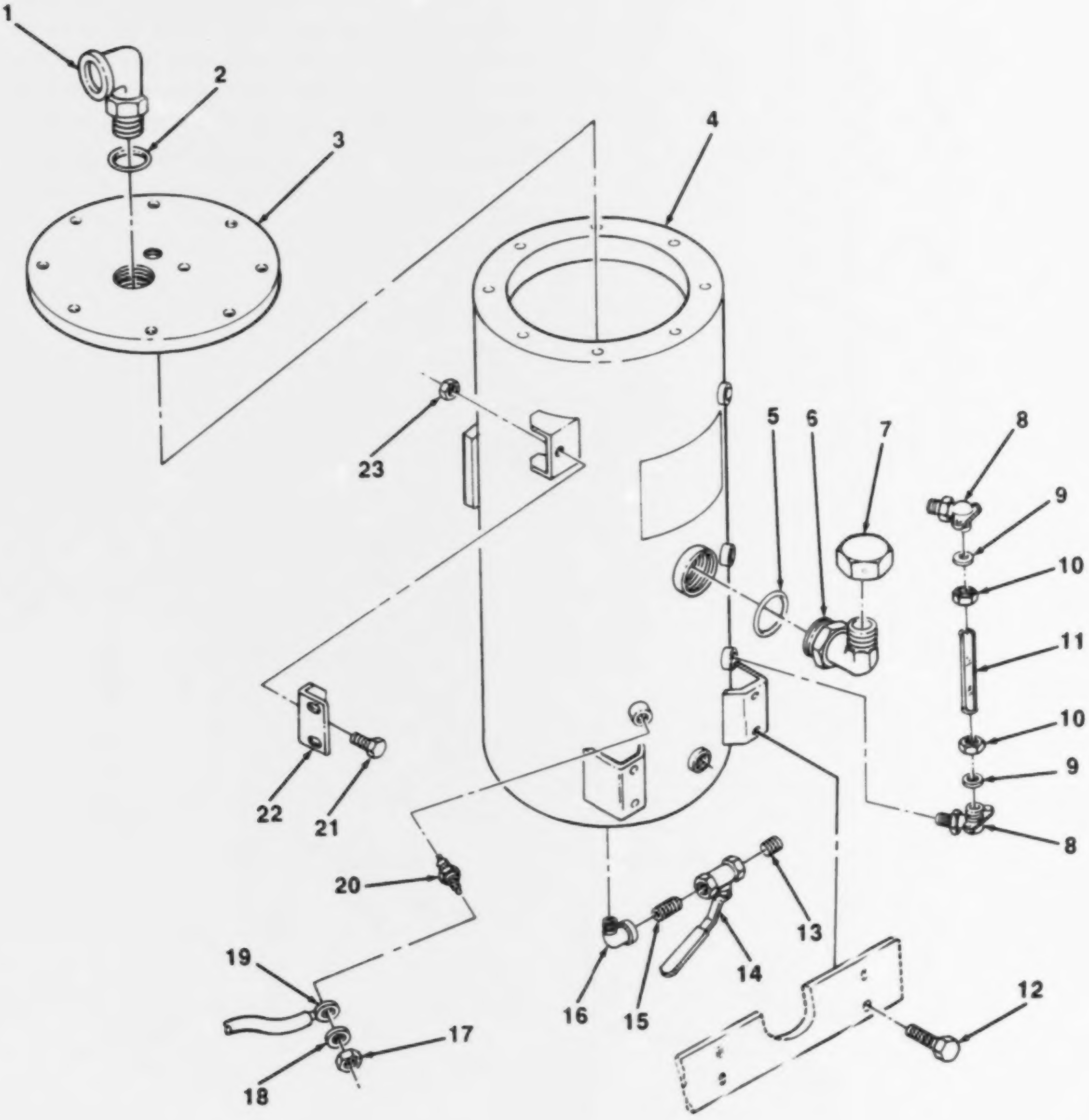
b. DISASSEMBLY

1. Remove elbow (6), preformed packing (5), and dust cap (7) from oil separator (4). Discard preformed packing.
2. Unscrew 2 nuts (10) and remove sight glass (11) and 2 gaskets (9) from 2 fittings (8). Remove fittings from oil separator (4). Discard gaskets.
3. Remove pressure transmitter (20) from oil separator (4).

4-88. OIL SEPARATOR MAINTENANCE (Con't).

c. ASSEMBLY

1. Install pressure transmitter (20) in oil separator (4).
2. Install 2 fittings (8) in oil separator (4). Install sight glass (11), 2 new gaskets (9), and nuts (10) on fittings so sight glass can be read from the side of the unit.
3. Install elbow (6), dust cap (7), and new preformed packing (5) in oil separator (4).

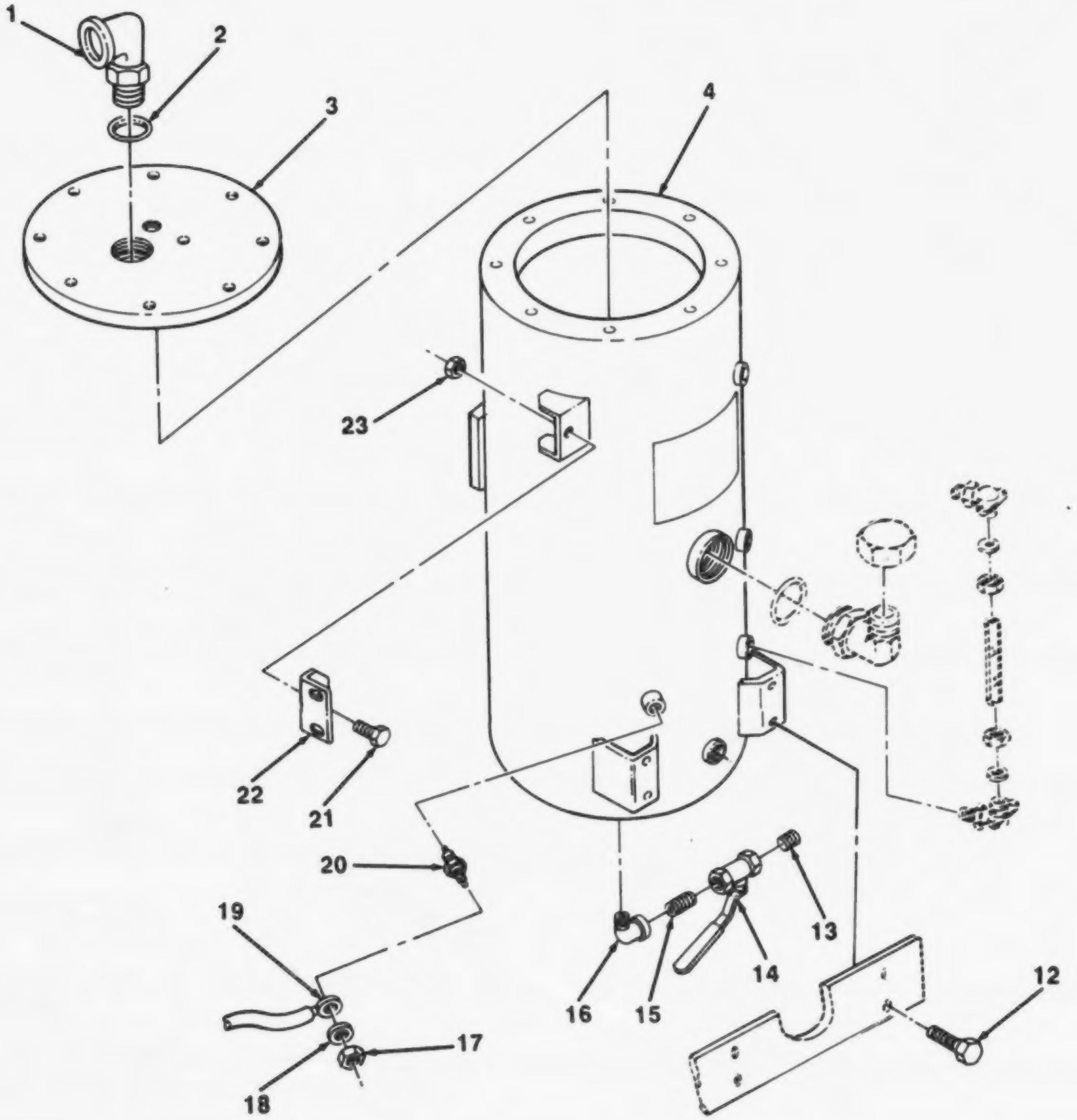


TA505536

4-88. OIL SEPARATOR MAINTENANCE (Con't).

d. INSTALLATION

1. Using a suitable lifting device, position oil separator (4) in place in compressor unit and install 6 new self-locking bolts (12).
2. Install new self-locking screw (21) and nut (23) in bracket (22) and oil separator (4).
3. Install electrical lead (19), new lockwasher (18) and nut (17) on pressure transmitter (20).



TA505537

4-88. OIL SEPARATOR MAINTENANCE (Con't).

4. Install elbow (1) and new preformed packing (2) in oil separator cover (3).

5. Install nipple (15), elbow (16), and drain valve (14) on oil separator (4). Install plug (13) in drain valve.

FOLLOW-ON TASKS:

- Install oil separator to temperature bypass valve tube (see paragraph 4-86).
- Install oil separator filter element (see paragraph 4-87).
- Install air inlet hose (see paragraph 4-97).
- Install safety relief valve (see paragraph 4-96).
- Install manual blowdown valve (see paragraph 4-95).
- Install check valve, filter, and scavage tube (see paragraph 4-86).
- Fill oil separator with oil (see LO 5-4310-452-12).
- Start engine and check for leaks (see paragraph 2-12).
- Close access door assembly.

4-89. COMPRESSOR AIR CLEANER ASSEMBLY REPLACEMENT.

THIS TASK COVERS

a. Removal b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Compressor air cleaner filter element removed (see paragraph 3-4).

Tools/Test Equipment:

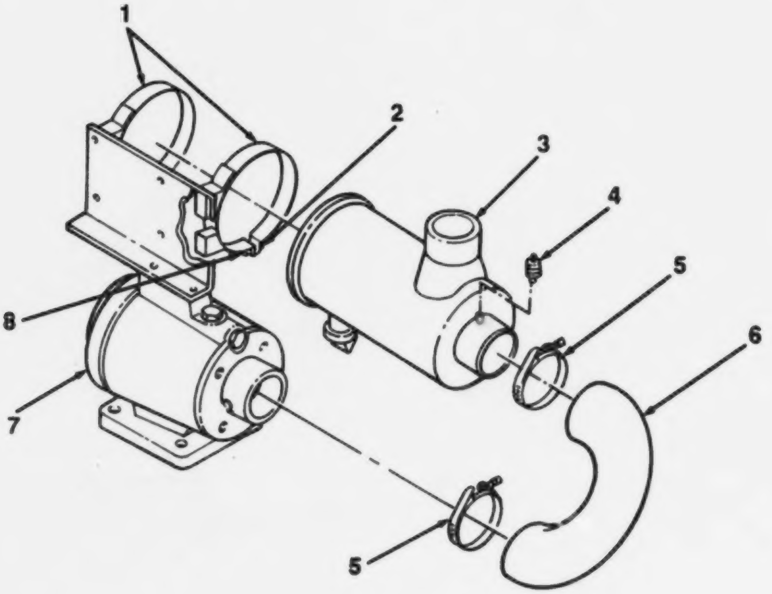
- General mechanic's tool kit

a. REMOVAL

1. Loosen 2 clamps (5) on hose (6). Remove hose and clamps from air cleaner body (3) and unloader valve (7).
2. Remove 2 clamp screws (2), nuts (8), and air cleaner body (3) from 2 clamps (1).
3. Remove restriction indicator (4) from air cleaner body (3).

b. INSTALLATION

1. Install restriction indicator (4) in air cleaner body (3).
2. Position air cleaner body (3) in place in clamps (1). Install 2 screws (2) and nuts (8).
3. Install hose (6) and 2 clamps (5) on air cleaner body (3) and unloader valve (7). Tighten clamps.



TA505538

4-89. COMPRESSOR AIR CLEANER ASSEMBLY REPLACEMENT (Con't).

FOLLOW-ON TASKS:

- Install compressor air cleaner filter element (see paragraph 3-4).
- Close left and right door assemblies.

4-90. UNLOADER VALVE ASSEMBLY REPLACEMENT.

THIS TASK COVERS

a. Removal b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Engine and compressor air cleaner filter elements removed (see paragraph 3-4).
- Engine air cleaner assembly removed (see paragraph 4-16).
- Compressor air cleaner assembly removed (see paragraph 4-89).
- Air lines and fittings removed (see paragraph 4-98).

Materials/Parts:

- Rag (Item 11, Appendix E)
- Two gaskets

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Remove hose (11) from fittings (8 and 13).
2. Unscrew fittings (8 and 13) from unloader valve (4).
3. Remove hose assembly (1) and elbow (2) from unloader valve (4).
4. Remove 4 nuts (3), unloader valve (4), and gasket (12) from compressor housing (10). Discard gasket.

CAUTION

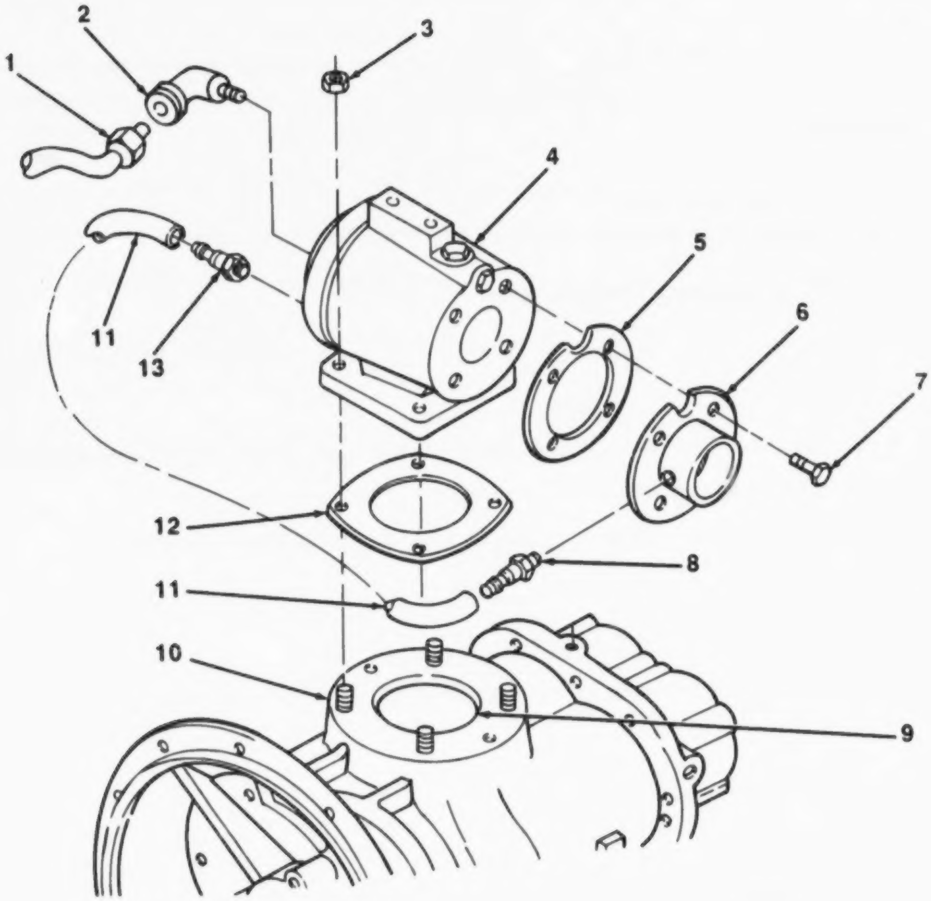
Ensure that intake hole is covered to prevent dust and debris from entering compressor. Dust and debris can cause internal damage to the compressor.

5. Cover intake hole (9) in compressor housing (10) with a rag.
6. Remove 4 capscrews (7), shaft collar (6), and gasket (5) from unloader valve assembly (4). Discard gasket.

b. INSTALLATION

1. Install shaft collar (6), new gasket (5), and 4 capscrews (7) on unloader valve (4).
2. Remove rag from intake hole (9) and position new gasket (12) and unloader valve (4) in place on compressor housing (10).
3. Install 4 nuts (3). Tighten nuts to 96 lb.-ft. (130 N•m.)
4. Install hose assembly (1) and elbow (2) on unloader valve (4).
5. Install fittings (8 and 13) in unloader valve (4). Install hose (11) on fittings.

4-90. UNLOADER VALVE ASSEMBLY REPLACEMENT (Con't).



FOLLOW-ON TASKS:

- Install air lines and fittings (see paragraph 4-98).
- Install compressor air cleaner assembly (see paragraph 4-89).
- Install engine air cleaner assembly (see paragraph 4-16).
- Install engine and compressor air cleaner filter element (see paragraph 3-4).
- Close left and right door assemblies.

TA505539

4-91. COMPRESSOR FAN BELT REPLACEMENT.

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Compressor air cleaner filter element removed (see paragraph 3-4).
- Compressor air cleaner assembly removed (see paragraph 4-89).

Materials/Parts:

- Four self-locking screws

Tools/Test Equipment:

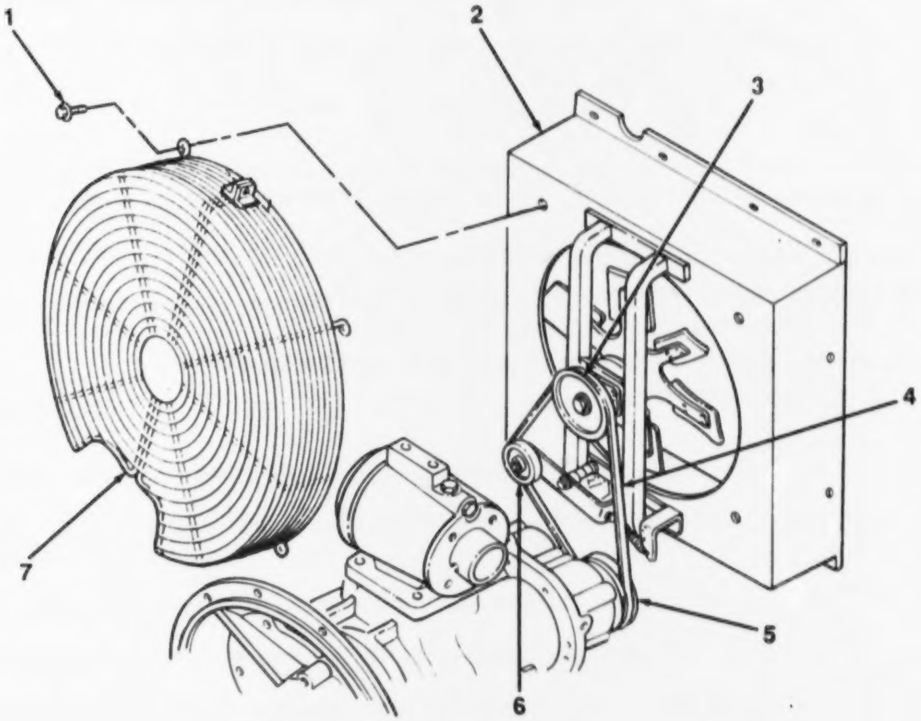
- General mechanic's tool kit

a. REMOVAL

1. Remove 4 self-locking screws (1) and fan guard (7) from fan shroud (2). Discard self-locking screws.
2. Remove fan belt (4) from pulleys (3, 5, and 6).
3. Inspect fan belt (4) for wear, cracks, or frayed condition. Replace if necessary.

b. INSTALLATION

1. Install fan belt (4) on pulleys (3, 5, and 6).
2. Install fan guard (7) on fan shroud (2) with 4 new self-locking screws (1).



TA505540

4-91. COMPRESSOR FAN BELT REPLACEMENT (Con't).

FOLLOW-ON TASKS:

- Install compressor air cleaner assembly (see paragraph 4-89).
- Install compressor air cleaner filter element (see paragraph 3-4).
- Close left and right door assemblies.

4-92. COMPRESSOR FAN AND FAN DRIVE MAINTENANCE.

THIS TASK COVERS

a. Removal
b. Disassembly
c. Assembly
d. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Compressor fan belt removed (see paragraph 4-91).

Tools/Test Equipment:

- General mechanic's tool kit
- Arbor press

Materials/Parts:

- Two bushings
- Two retaining rings
- Two self-locking nuts

a. REMOVAL

1. Remove 4 screws (1), and nuts (4) from fan bearing housing support (2) and fan shroud (3).

CAUTION

Use care when removing fan bearing housing support from fan shroud. Striking fan against fan shroud can result in bent fan blades or damage to fan shroud.

2. Remove fan bearing housing support (2) from fan shroud (3).

b. DISASSEMBLY

1. Remove capscrew (23), pulley (21), 3 flatwashers (22), and self-locking nut (16) from idler lever assembly (17). Discard self-locking nut.

2. Remove spring (13) from idler lever assembly (17) and fan bearing housing support bracket (2).

NOTE

Keep idler lever assembly together on capscrew when removing.

3. Remove self-locking nut (12), idler lever assembly (17), 8 spring tension washers (14), spacer (18), capscrew (20), and washer (19) from fan bearing housing support (2). Discard self-locking nut.

4. Remove 2 bushings (15) from idler lever assembly (17). Discard bushings.

5. Measure and record distance between hub (7) and plate on fan bearing housing support (2) and from pulley (25) to plate.

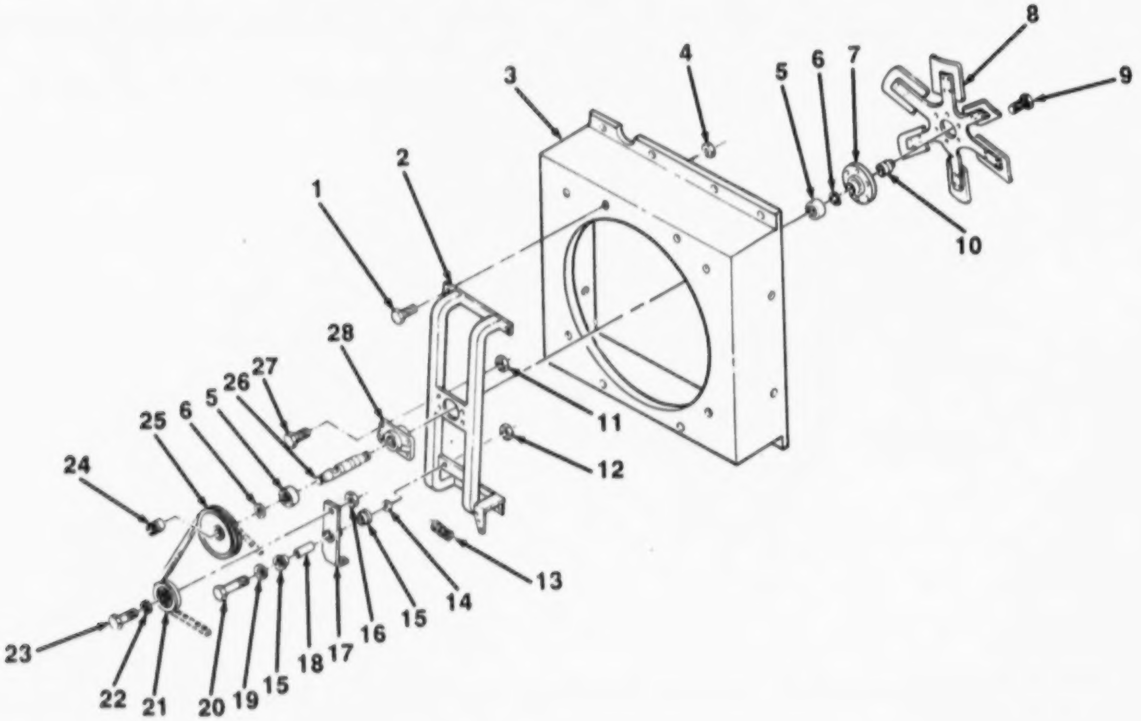
CAUTION

Use care not to bend fan blades when removing sleeve nuts from shaft.

6. Remove sleeve nut (10) and fan assembly (8) from shaft (26). Remove 6 screws (9) from fan assembly and hub (7). Remove hub.

4-92. COMPRESSOR FAN AND FAN DRIVE MAINTENANCE (Con't).

7. Remove sleeve nut (24) and pulley (25) from shaft (26).
8. Remove 4 screws (27), nuts (11), and fan bearing housing (28) from fan bearing housing support (2).
9. Remove 2 retaining rings (6) from shaft (26). Discard retaining rings.
10. Using an arbor press, drive shaft (26) and 2 bearings (5) out of fan bearing housing (28).
11. Inspect bearings (5) for rust, pits, or signs of scoring. Replace if necessary.



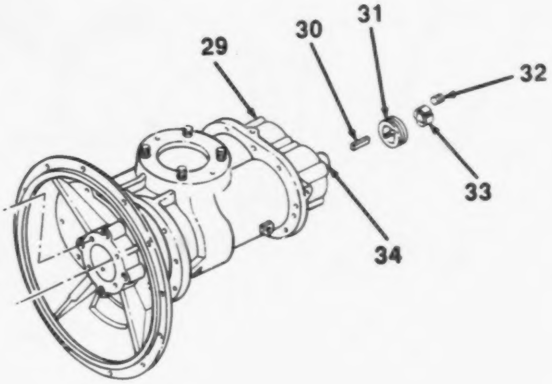
TA505541

4-92. COMPRESSOR FAN AND FAN DRIVE MAINTENANCE (Con't).

12. Measure and record distance between pulley (31) and compressor end housing (29).
13. Remove 2 setscrews (32) from pulley (31) and bushing (33). Install one setscrew (32) in empty jackscrew hole until pulley is off bushing.
14. Using screwdriver in slot of bushing (33), pry bushing and pulley (31) off shaft (34). Remove key (30).

c. ASSEMBLY

1. Install key (30) in shaft (34).
2. Position and hold pulley (31) and bushing (33) in place on shaft (34) using distance recorded before removal. Install 2 setscrews (32) in bushing (33) and pulley (31).



3. Using arbor press, press shaft (26) and 2 bearings (5) in fan bearing housing (28). Install 2 new retaining rings (6) on shaft.
4. Position fan bearing housing (28) in place on plate of fan bearing housing support (2). Install 4 screws (27) and nuts (11).
5. Position and hold hub (7) in place on shaft (26) using distance recorded before removal. Install sleeve nut (10) on shaft.
6. Position and hold pulley (25) in place on shaft (26) using distance recorded before removal. Install sleeve nut (24) on shaft.
7. Using an arbor press, press 2 new bushings (15) in idler lever assembly (17).
8. Install capscrew (20), washer (19), and spacer (18), in idler lever assembly (17). Install 8 spring tension washers (14) on capscrew (20) and spacer (18).
9. Position idler lever assembly (17) on fan bearing housing support (2).
10. Install spring (13) on idler lever assembly (17) and fan bearing housing support bracket (2). Swing idler lever assembly (17) into position on fan bearing housing support (2) and install new self-locking nut (12).

TA505542

4-92. COMPRESSOR FAN AND FAN DRIVE MAINTENANCE (Con't).

11. Install pulley (21), 2 flatwashers (22), capscrew (23), and new self-locking nut (16) on idler lever assembly (17).

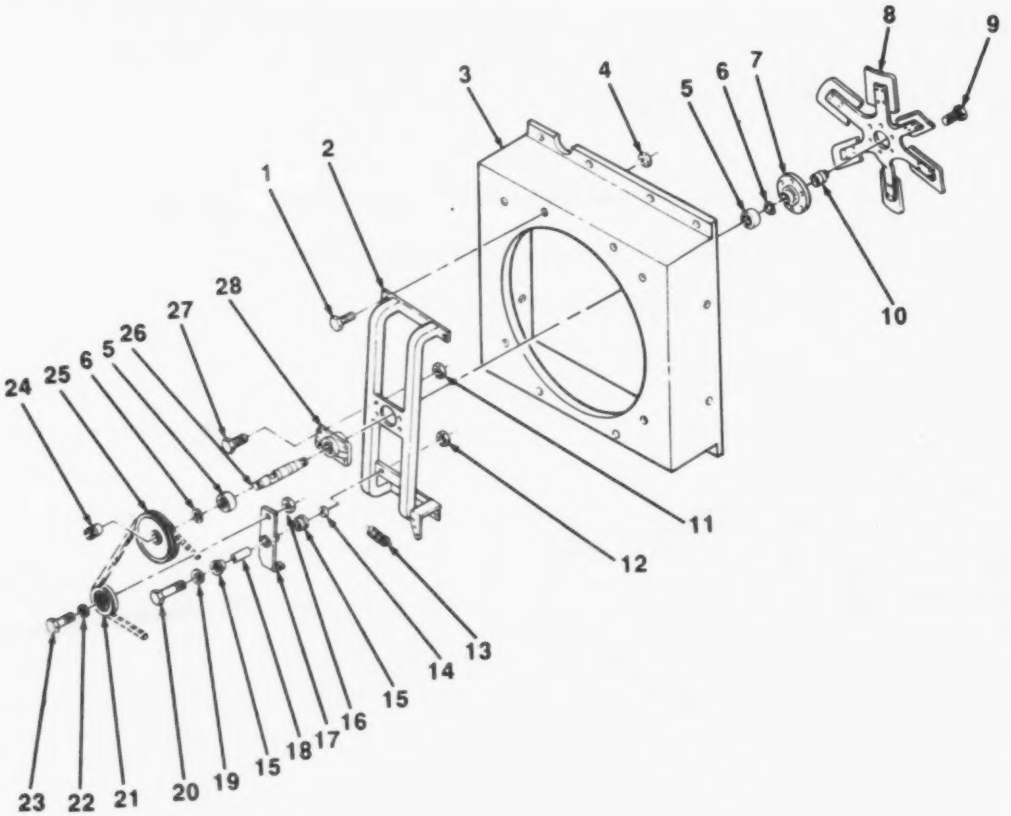
12. Position fan (8) on hub (7) and install 6 screws (9).

d. INSTALLATION

CAUTION

Use care when installing fan bearing housing support on fan shroud. Striking fan against fan shroud can result in bent fan blades or damage to fan shroud.

1. Position fan bearing housing support (2) in place on fan shroud (3) and install 4 screws (1) and nuts (4).



FOLLOW-ON TASKS:

- Install compressor fan belt (see paragraph 4-91).
- Close left and right door assemblies.

TA505543

4-93. MOISTURE FILTER/SEPARATOR REPLACEMENT.

THIS TASK COVERS

a. Removal b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Battery cables disconnected (see paragraph 4-57).
- System air pressure relieved.

Tools/Test Equipment:

- General mechanic's tool kit

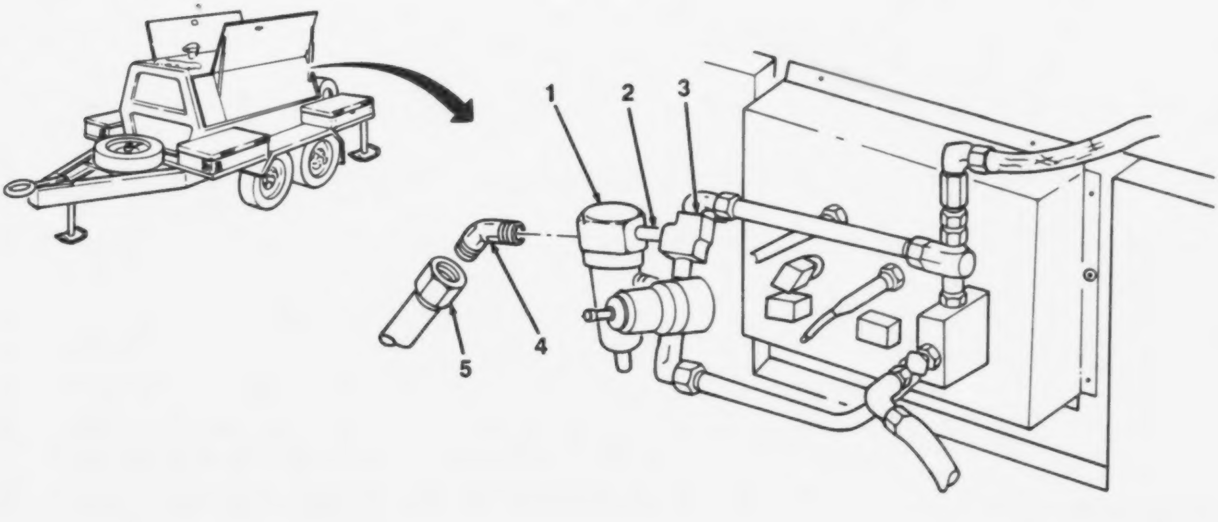
a. REMOVAL

1. Disconnect tube fitting (5) from elbow (4).

NOTE

Nipple may stay in either moisture filter/separator or pipe tee.

2. Remove moisture filter/separator (1) from pipe tee (3) and nipple (2).
3. Remove elbow (4) from moisture filter/separator (1).



TA505544

4-93. MOISTURE FILTER/SEPARATOR REPLACEMENT (Con't).

b. INSTALLATION

1. Install nipple (2) and moisture filter/separator (1) on pipe tee (3).
2. Install elbow (4) in moisture filter/separator (1).
3. Connect tube fitting (5) to elbow (4).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left and right door assemblies.

4-94. REGULATING VALVE REPLACEMENT.

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- System air pressure relieved.
- Battery cables disconnected (see paragraph 4-57).
- Moisture filter/separator removed (see paragraph 4-93).

Tools/Test Equipment:

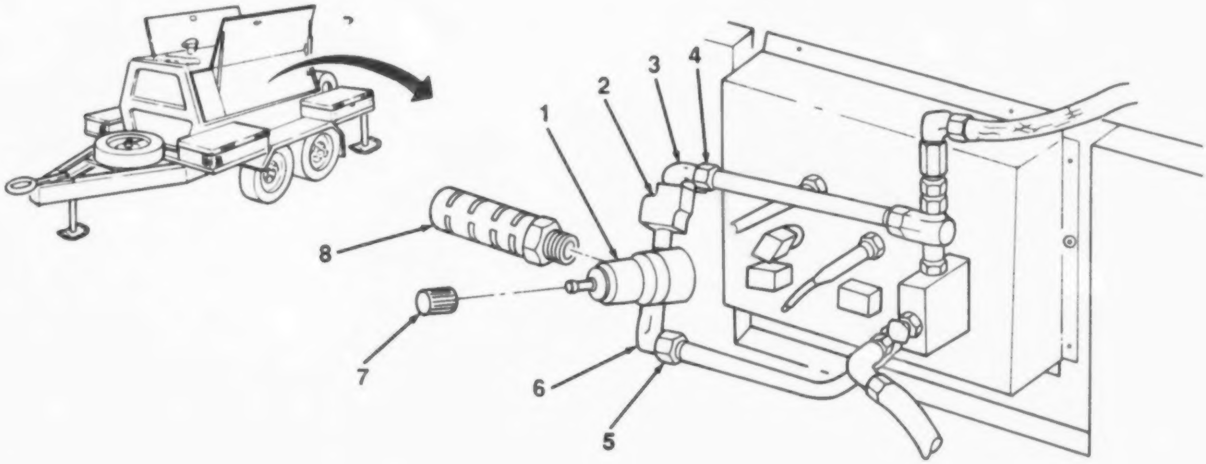
- General machanic's tool kit

a. REMOVAL

1. Disconnect tube fitting (4) from elbow (3).
2. Disconnect tube fitting (5) from elbow (6).
3. Remove pipe tee (2) and elbow (3) from regulating valve (1).
4. Remove air silencer (8) and elbow (6) from regulating valve (1).
5. Remove knob (7) from regulating valve (1).

b. INSTALLATION

1. Install knob (7) on regulating valve (1).
2. Install air silencer (8) and elbow (6) on regulating valve (1).



TA505545

4-94. REGULATING VALVE REPLACEMENT (Con't).

3. Install pipe tee (2) and elbow (3) on regulating valve (1).
4. Position regulating valve (1) in place and connect tube fitting (5) to elbow (6).
5. Connect tube fitting (4) to elbow (3).

FOLLOW-ON TASKS:

- Install moisture filter/separator (see paragraph 4-93).
- Connect battery cables (see paragraph 4-57).
- Close left and right door assemblies.

4-95. BLOWDOWN VALVE REPLACEMENT.

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Right door assembly open.
- System air pressure relieved.

Materials/Parts:

- One preformed packing

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

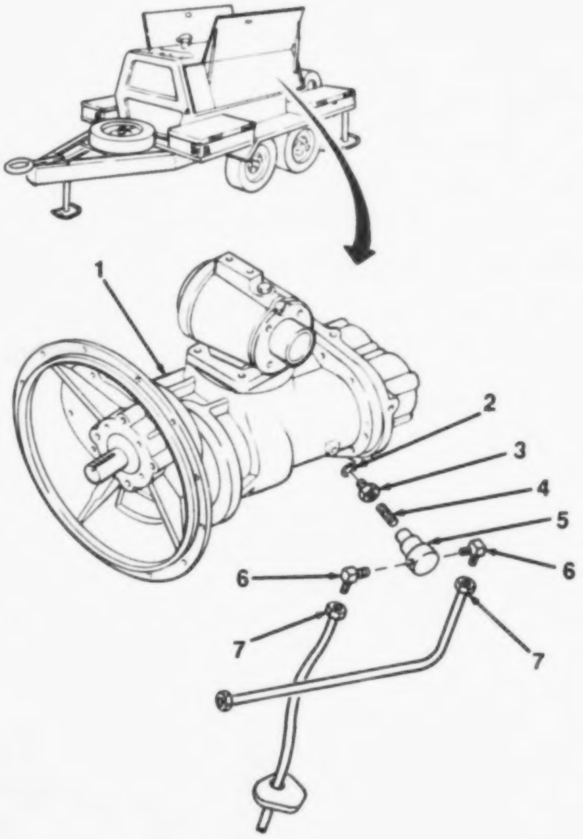
WARNING

Ensure that system air pressure is relieved before removing blowdown valve. Compressed air can cause serious injury to personnel.

1. Disconnect 2 hose fittings (7) from elbows (6).
2. Remove elbows (6) from blowdown valve (5).
3. Remove blowdown valve (5), nipple (4), adapter (3), and preformed packing (2) from compressor (1). Remove nipple from blowdown valve. Discard preformed packing.

b. INSTALLATION

1. Install adapter (3), new preformed packing (2), and nipple (4) on compressor (1). Install blowdown valve (5) on nipple.
2. Install 2 elbows (6) on blowdown valve (5).
3. Connect 2 fittings (7) to elbows (6).



TA505546

FOLLOW-ON TASKS:

- Close right door assembly.

4-96. SAFETY RELIEF VALVE REPLACEMENT.

THIS TASK COVERS

a. Removal b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Access door assembly open.
- System air pressure relieved.

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

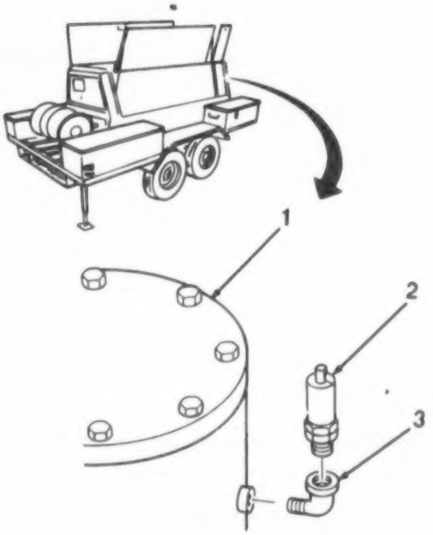
WARNING

Ensure that system air pressure is relieved before removing safety relief valve. Compressed air can cause serious injury to personnel.

1. Remove safety relief valve (2) from elbow (3). Remove elbow from oil separator (1).
2. Inspect safety relief valve (2) for damage. Replace if necessary.

b. INSTALLATION

1. Install elbow (3) in oil separator (1).
2. Install safety relief valve (2) on elbow (3).



FOLLOW-ON TASKS:

- Close access door assembly.

TA505547

4-97. AIR INLET HOSE REPLACEMENT.

THIS TASK COVERS

a. Removal
b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Air pressure relieved.
- Right door assembly open.
- Front end panel assembly removed (see paragraph 4-82).

Materials/Parts:

- Eight lockwashers
- Two preformed packings

Tools/Test Equipment:

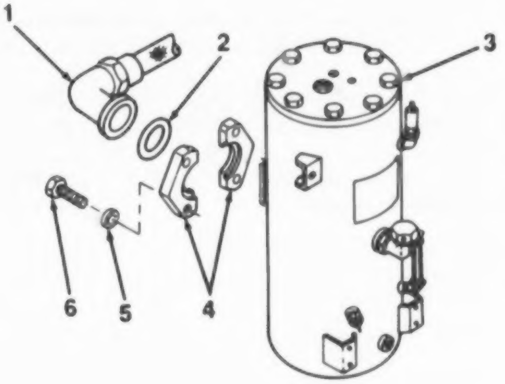
- General mechanic's tool kit

a. REMOVAL

NOTE

Air inlet hose may contain oil. Use a suitable container to catch excess oil.

1. Remove 4 capscrews (6), lockwashers (5), pipe flanges (4), and air inlet hose (1) from oil separator (3). Discard lockwashers.



2. Remove 4 capscrews (9), lockwashers (10), pipe flanges (8), and air inlet hose (1) from air compressor (7). Discard lockwashers.
3. Remove 2 preformed packings (2) from ends of air inlet hose (1). Discard preformed packings.

b. INSTALLATION

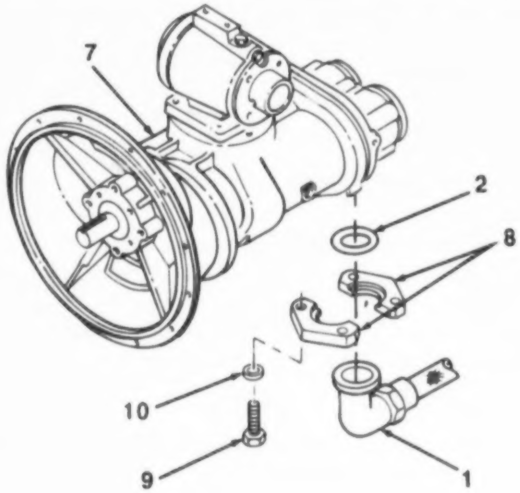
1. Install 2 new preformed packings (2) in air inlet hose (1).
2. Position air inlet hose (1) in place on compressor (7) and oil separator (3).

TA505548

4-97. AIR INLET HOSE REPLACEMENT (Con't).

3. Install 4 capscrews (9), new lockwashers (10), pipe flanges (8), and air inlet hose (1) on air compressor (7).

4. Install 4 capscrews (6), new lockwashers (5), pipe flanges (4), and air inlet hose (1) on oil separator (3).



FOLLOW-ON TASKS:

- Install front end panel assembly (see paragraph 4-82).
- Close right door assembly.

TA505549

4-98. COMPRESSOR AIR LINES, HOSES, AND FITTING REPLACEMENT.

THIS TASK COVERS

a. Removal b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Battery cables disconnected (see paragraph 4-57).

Tools/Test Equipment:

- General mechanic's tool kit

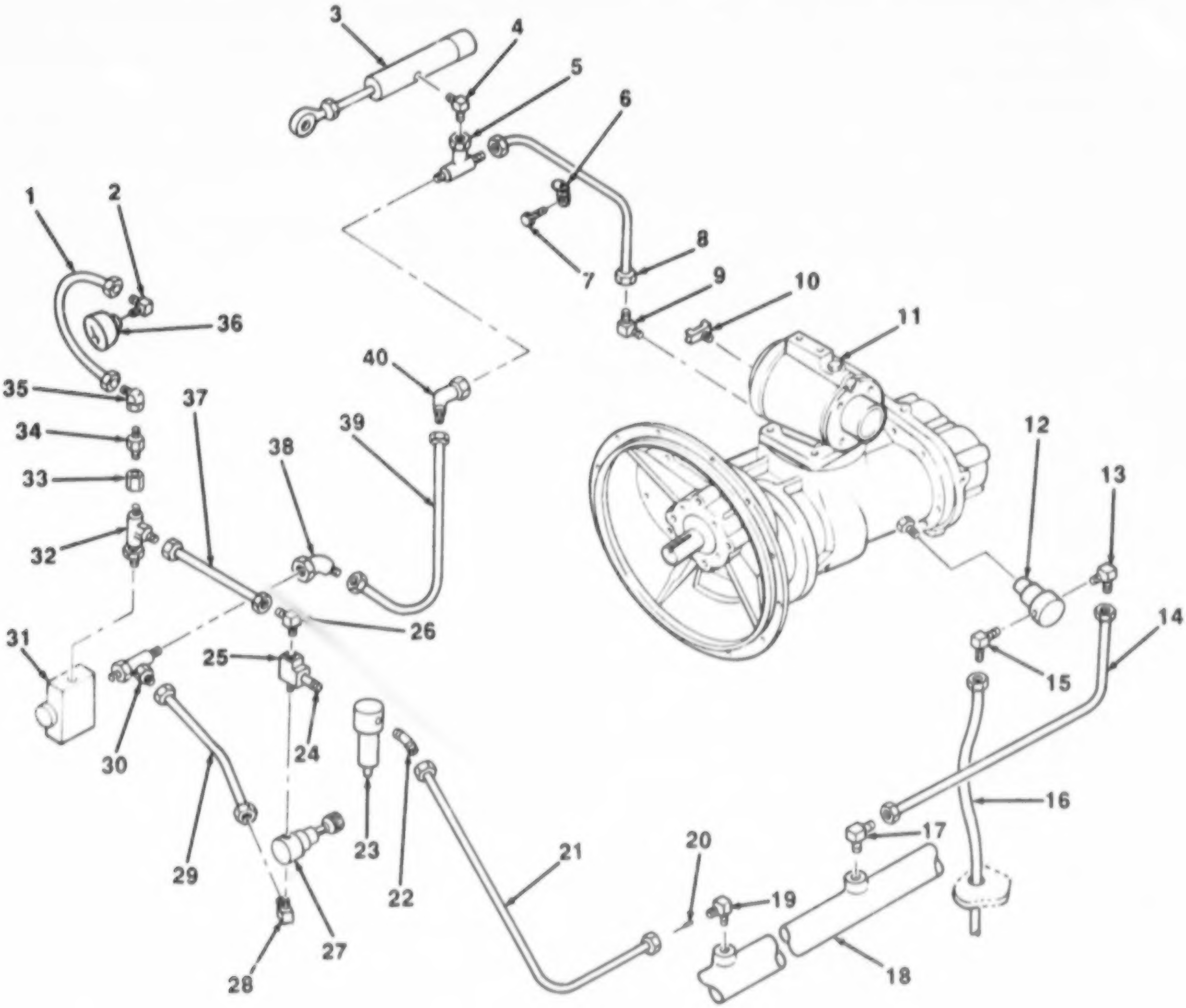
a. REMOVAL

1. Disconnect hose assembly (8) from tube tee (5) and elbow (9). Remove screw (7) and loop clamp (6) from hose assembly. Remove elbow from unloader valve (11).
2. Remove drain cock (10) from unloader valve (11).
3. Disconnect hose assembly (14) from 2 elbows (13 and 17). Remove elbow (13) from blowdown valve (12). Remove elbow (17) from air discharge tube assembly (18).
4. Disconnect hose assembly (16) from elbow (15). Remove elbow from blowdown valve (12).
5. Disconnect tube assembly (21) from elbows (19 and 22). Remove element strainer (20) from tube assembly.
6. Remove elbow (19) from air discharge tube assembly (18). Remove elbow (22) from moisture filter/separator (23).
7. Remove moisture filter/separator (23) from nipple (24). Remove nipple from tube tee (25).
8. Disconnect tube assembly (29) from elbow (28) and tube tee (30). Remove elbow from regulating valve (27).
9. Disconnect tube assembly (37) from elbow (26) and tube tee (32). Remove elbow from tube tee (25).
10. Disconnect hose assembly (39) from elbows (38 and 40). Remove elbow (38) and tube tee (30) from service-air valve (31).
11. Disconnect hose assembly (1) from elbows (2 and 35). Remove elbow (35) from reducer (34). Remove elbow (2).
12. Remove reducer (34), tube coupling nut (33), and tube tee (32) from service-air valve (31).
13. Remove elbow (40) from tube tee (5). Remove tube tee and elbow (4) from governor control cylinder assembly (3).

b. INSTALLATION

1. Install elbow (4) and tube tee (5) on governor control cylinder assembly (3). Install elbow (40) on tube tee.
2. Install tube tee (32), tube coupling nut (33), and reducer (34) on service-air valve (31).

4-98. COMPRESSOR AIR LINES, HOSES, AND FITTING REPLACEMENT (Con't).

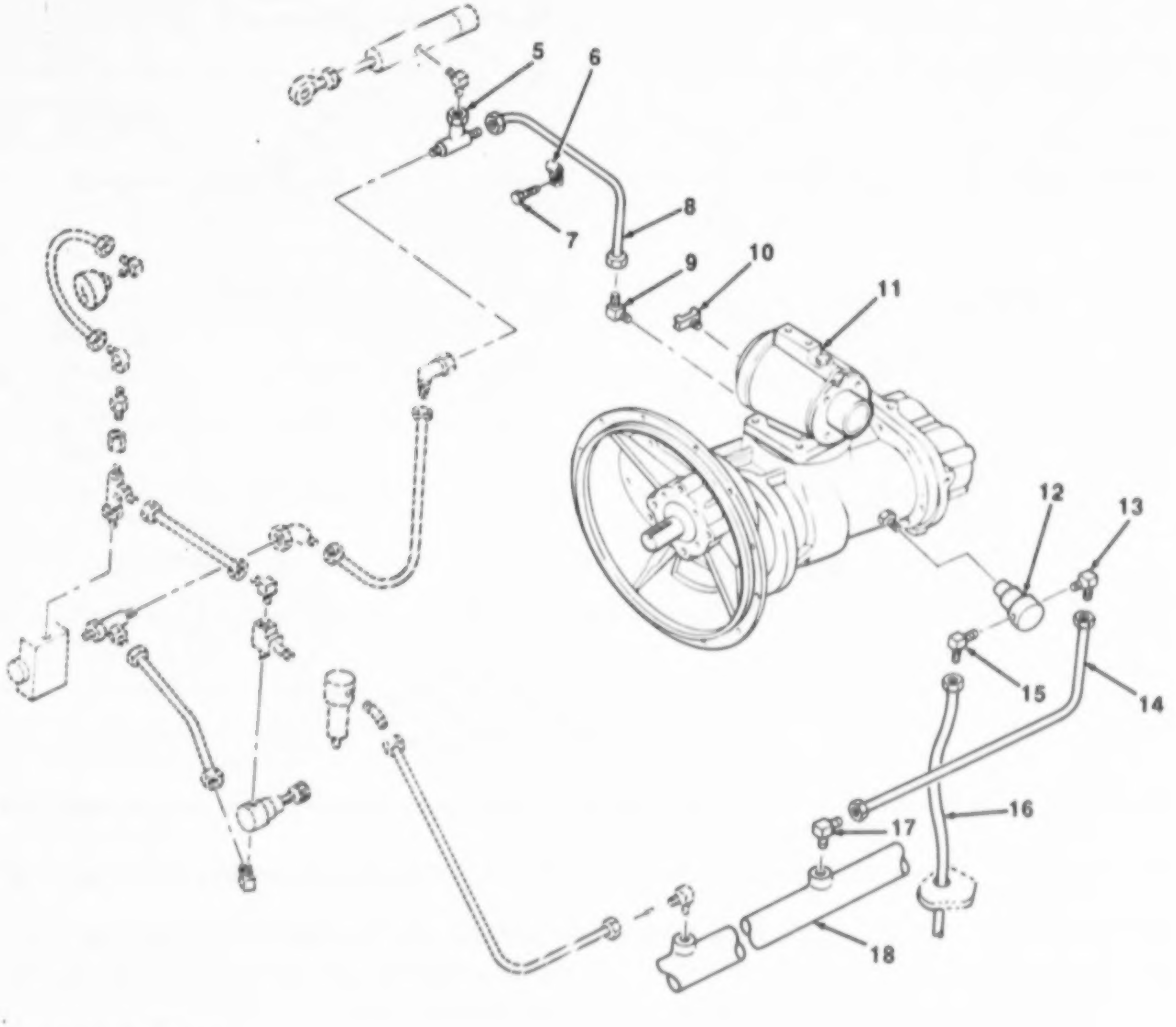


3. Install elbow (2) in discharge pressure gage (36). Install elbow (35) on reducer (34). Connect hose assembly (1) on elbows (2 and 35).
4. Install tube tee (30) and elbow (38) in service-air valve (31). Connect hose assembly (39) to elbows (38 and (40).
5. Install elbow (26) on tube tee (25). Connect tube assembly (37) to elbow (26) and tube tee (32).
6. Install elbow (28) on regulating valve (27). Connect tube assembly (29) on elbow and tube tee (30).
7. Install tube tee (25) and nipple (24) in moisture filter/separator (23).
8. Install elbow (22) on moisture filter/separator (23).
9. Install elbow (19) on air discharge tube assembly (18). Connect tube assembly (21) and element strainer (20) to elbows (19 and 22).

TA505550

4-98. COMPRESSOR AIR LINES, HOSES, AND FITTING REPLACEMENT (Con't).

10. Install elbow (15) on blowdown valve (12). Connect hose assembly (16) to elbow (15).
11. Install elbow (17) on air discharge tube assembly (18). Install elbow (13) in blowdown valve (12). Connect hose assembly (14) to elbows (13 and 17).
12. Install drain cock (10) in unloader valve (11).
13. Install elbow (9) in unloader valve (11). Connect hose assembly (8) to tube tee (5) and elbow (9).
14. Install loop clamp (6) on hose assembly (8) with screw (7).



FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left and right door assemblies.

TA505551

4-99. AIR DISCHARGE HOSE ASSEMBLY REPLACEMENT.

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- System air pressure relieved.

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

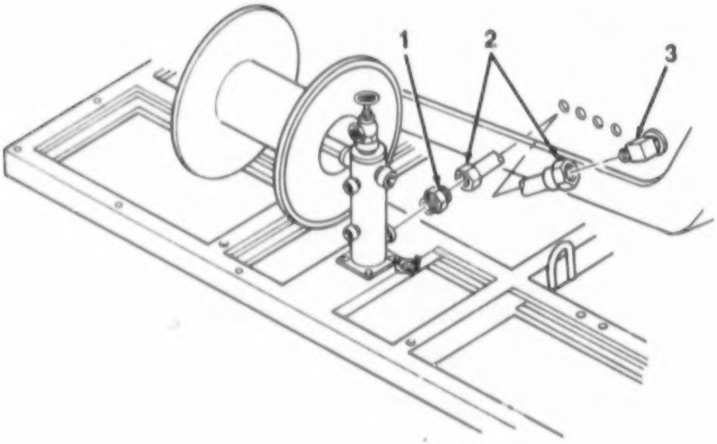
WARNING

To prevent injury, ensure that system air pressure is relieved before removing air discharge hose.

1. Disconnect air discharge hose assembly (2) from adapter (1) and elbow (3).

b. INSTALLATION

1. Position air discharge hose assembly (2) in place and connect to adapter (1) and elbow (3).



TA505552

4-100. MINIMUM PRESSURE AND SERVICE VALVE MAINTENANCE.

THIS TASK COVERS:

a. Removal
b. Disassembly
c. Assembly
d. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Right door assembly open.
- Battery cables disconnected (see paragraph 4-57).
- Air discharge hose assembly removed (see paragraph 4-99).

Materials/Parts:

- One gasket
- Three lockwashers
- Three preformed packings

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

WARNING

To prevent injury, ensure that system air pressure is relieved before removing minimum pressure and service valve.

1. Disconnect air discharge tube assembly (2) from adapter (20) and elbow (1).
2. Remove adapter (19) and preformed packing (20) from valve body (6). Discard preformed packing.
3. Remove elbow (17) and nipple (16) from service valve manifold (3).
4. Remove 3 capscrews (13), lockwashers (14), and flatwashers (15) from frame and service valve manifold (3). Discard lockwashers.
5. Remove service valve manifold (3) from frame.

b. DISASSEMBLY

1. Remove 4 capscrews (5), valve body (6), and gasket (4) from service valve manifold (3). Discard gasket.

WARNING

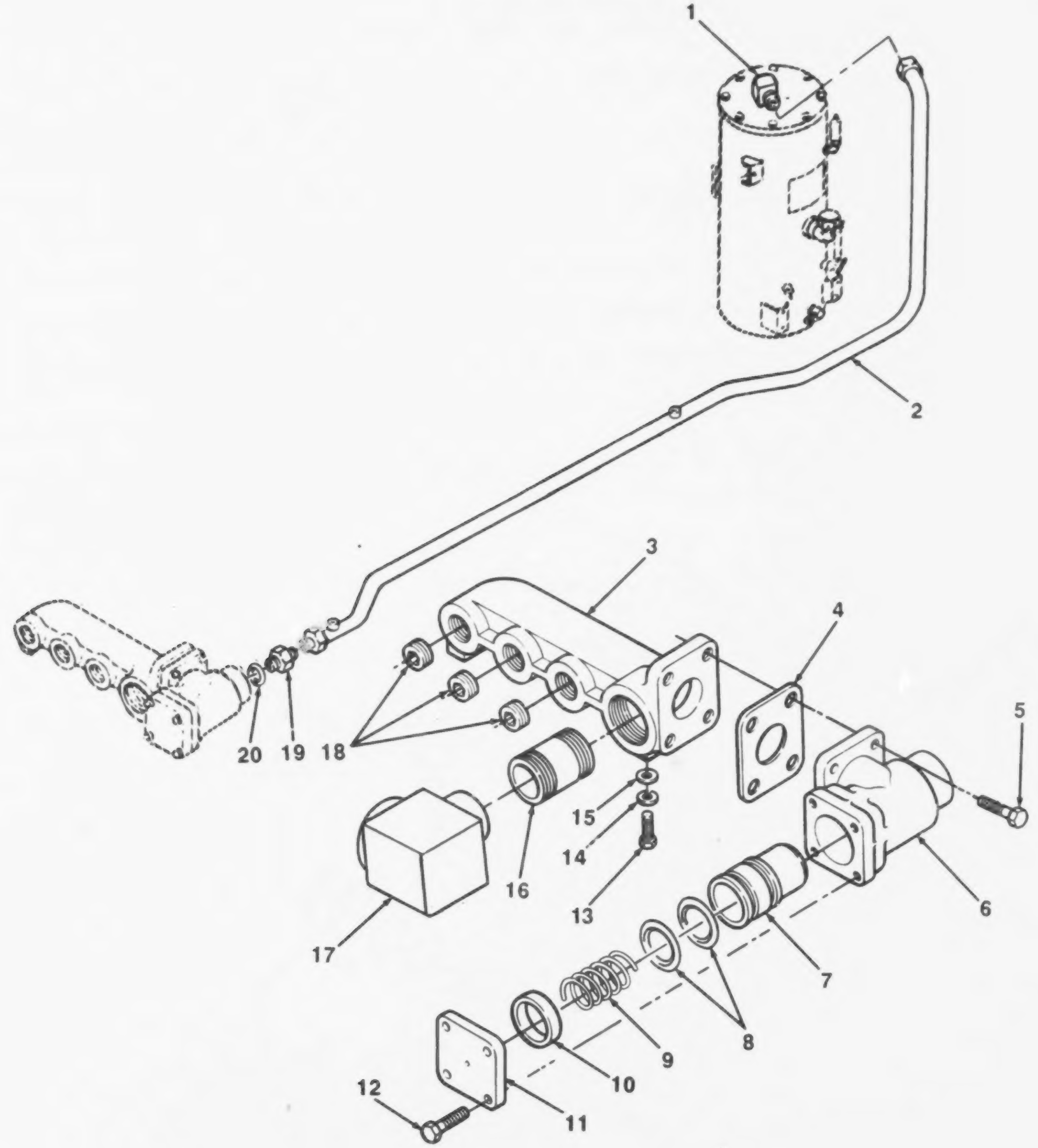
Spring is held under tension by cover. To prevent injury, loosen capscrews one full turn each, one turn at a time, until they are removed.

2. Remove 4 capscrews (12), cover (11), spring (9), flatwasher (10), and piston (7) from valve body (6).
3. Remove 2 preformed packings (8) from piston (7). Discard preformed packings.
4. Remove 3 pipe plugs (18) from service valve manifold (3).

c. ASSEMBLY

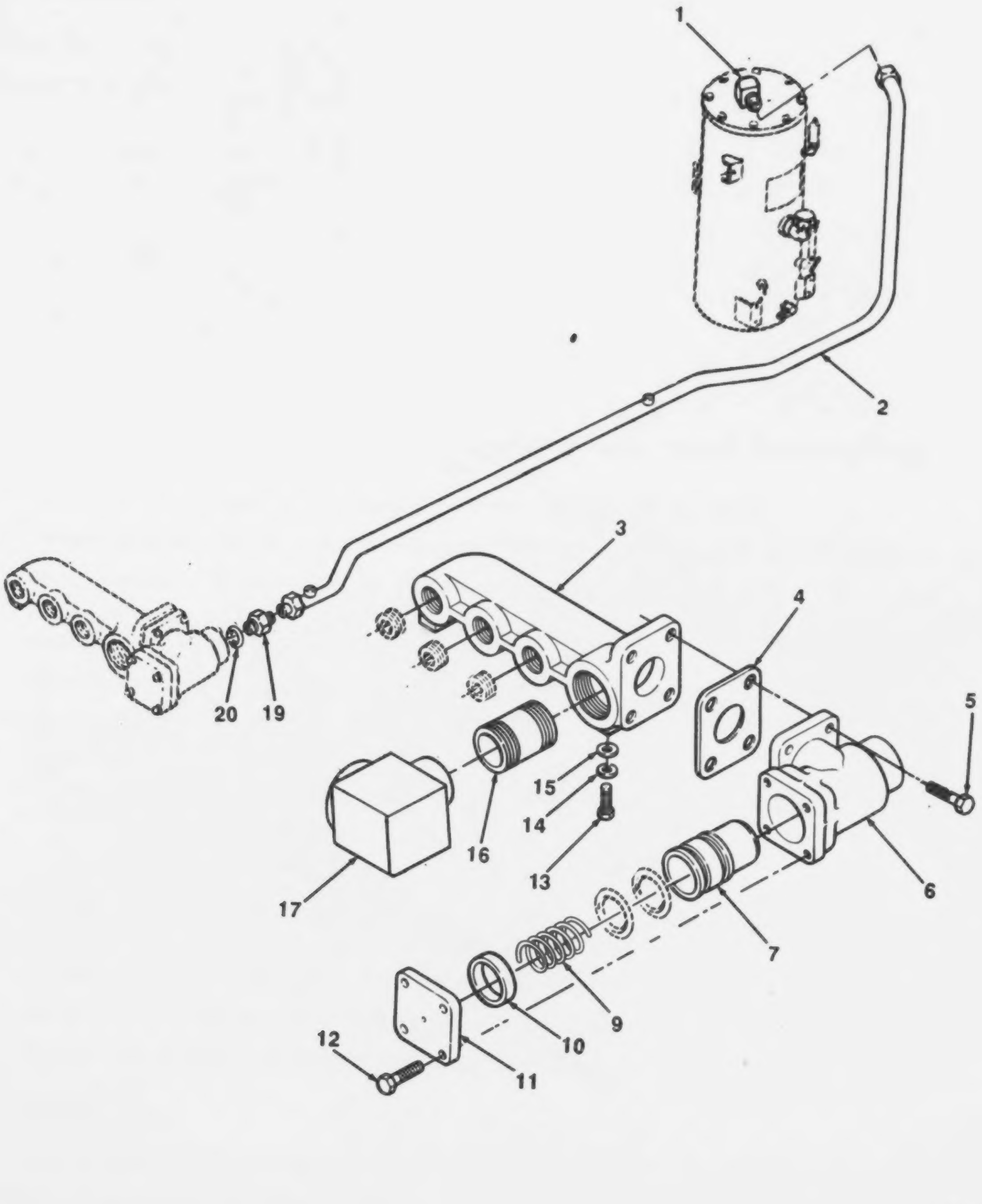
1. Install 3 pipe plugs (18) in service valve manifold (3).
2. Install 2 new preformed packings (8) in grooves on piston (7).

4-100. MINIMUM PRESSURE AND SERVICE VALVE MAINTENANCE (Con't).



TA505553

4-100. MINIMUM PRESSURE AND SERVICE VALVE MAINTENANCE (Con't).



TA505554

4-100. MINIMUM PRESSURE AND SERVICE VALVE MAINTENANCE (Con't).

3. Install piston (7), flatwasher (10), and spring (9) in valve body (6).

4. Position cover (11) in place on valve body (6) and install 4 capscrews (12), turning each capscrew one turn until cover is seated on valve body. Tighten capscrews to 18 lb.-ft. (24.4 N•m).

5. Install valve body (6) and new gasket (4) on service valve manifold (3) with 4 capscrews (5).

d. INSTALLATION

1. Position service valve manifold (3) in place and install 3 capscrews (13), new lockwashers (14), and flatwashers (15).

2. Install nipple (16) and elbow (17) on service valve manifold (3).

3. Install adapter (19) and new preformed packing (20) in service valve manifold (3).

4. Connect air discharge tube assembly (2) to adapter (20) and elbow (1).

FOLLOW-ON TASKS:

- Install air discharge hose assembly (see paragraph 4-99).
- Connect battery cables (see paragraph 4-57).
- Close right door assembly.

4-101. AIR DISCHARGE TUBE ASSEMBLY REPLACEMENT.

THIS TASK COVERS

a. Removal b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- Left door assembly open.
- Access door assembly open.
- Batteries removed (see paragraph 4-57).
- System air pressure relieved.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- Two lockwashers
- Two preformed packings
- Two self-locking nuts
- Two self-locking screws

a. REMOVAL

1. Remove nut (2), lockwasher (3), and battery cable (4) from starter solenoid (5). Discard lockwasher.
2. Remove 3 screws (25) from side baffle assembly (23).
3. Remove 3 screws (24) and nuts (20) from side baffle assembly (23) and front baffle assembly (1). Remove side baffle assembly and battery cable (4).
4. Remove 2 screws (21) from side baffle assembly (23).
5. Remove 2 self-locking screws (22) and nuts (6) from pipe cover (7) and gasket (8). Discard self-locking screws and nuts.
6. Remove nut (17), lockwasher (18), and wire (19) from pressure transmitter (12). Discard lockwasher.

WARNING

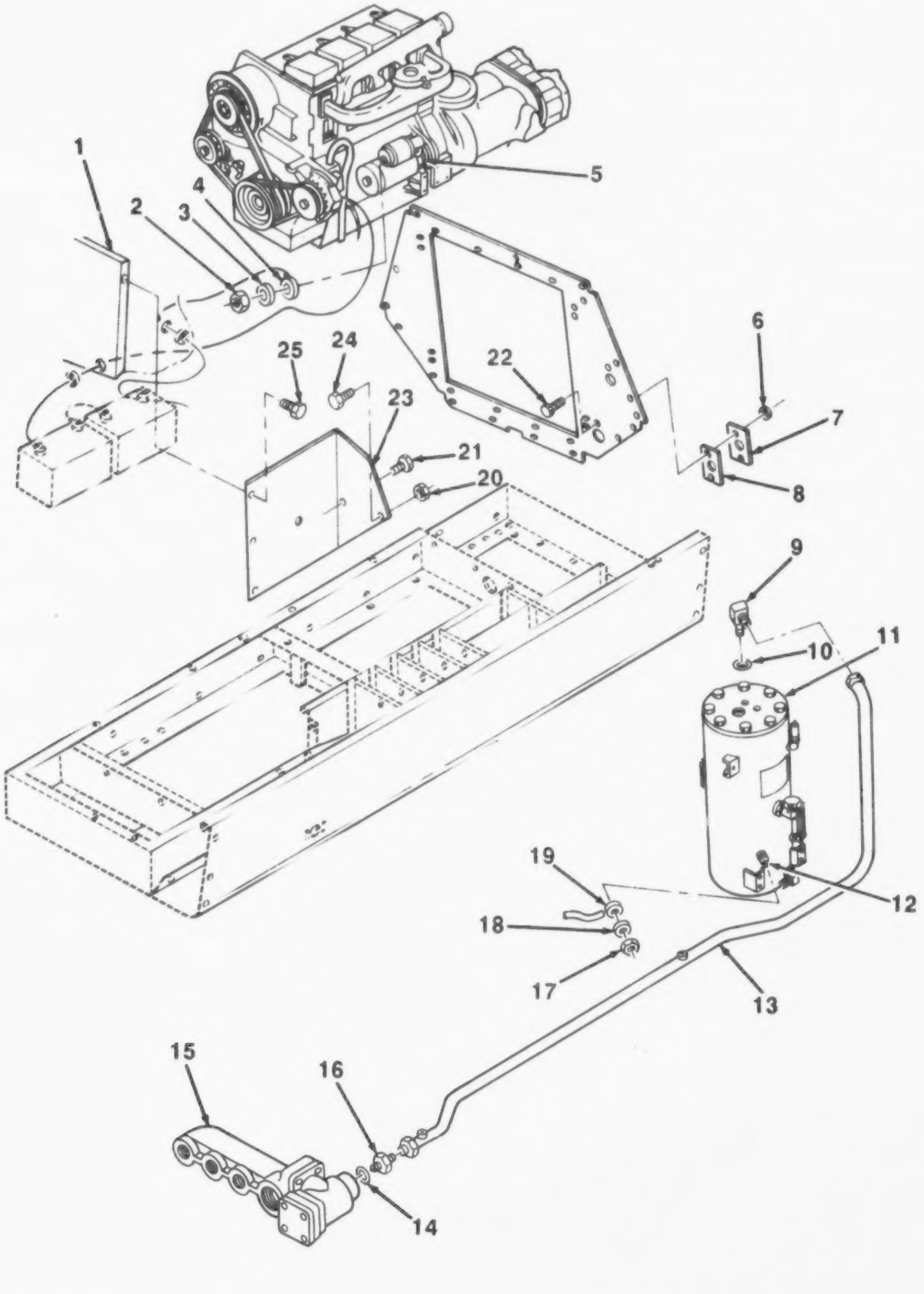
Ensure that system air pressure is relieved before removing air discharge tube assembly. Compressed air can cause serious injury to personnel.

7. Disconnect air discharge tube assembly (13) from elbow (9). Remove elbow and preformed packing (10) from oil separator tank (11). Discard preformed packing.
8. Remove pipe cover (7) and gasket (8) from air discharge tube assembly (13).
9. Disconnect air discharge tube assembly (13) from adapter (16). Remove air discharge tube assembly.
10. Remove adapter (16) and preformed packing (14) from minimum pressure service valve (15). Discard preformed packing.

b. INSTALLATION

1. Position air discharge tube assembly (13) in place and install gasket (8), pipe cover (7), and 2 new self-locking screws (22) and nuts (6).
2. Install elbow (9) and new preformed packing (10) in oil separator (11).

4-101. AIR DISCHARGE TUBE ASSEMBLY REPLACEMENT (Con't).



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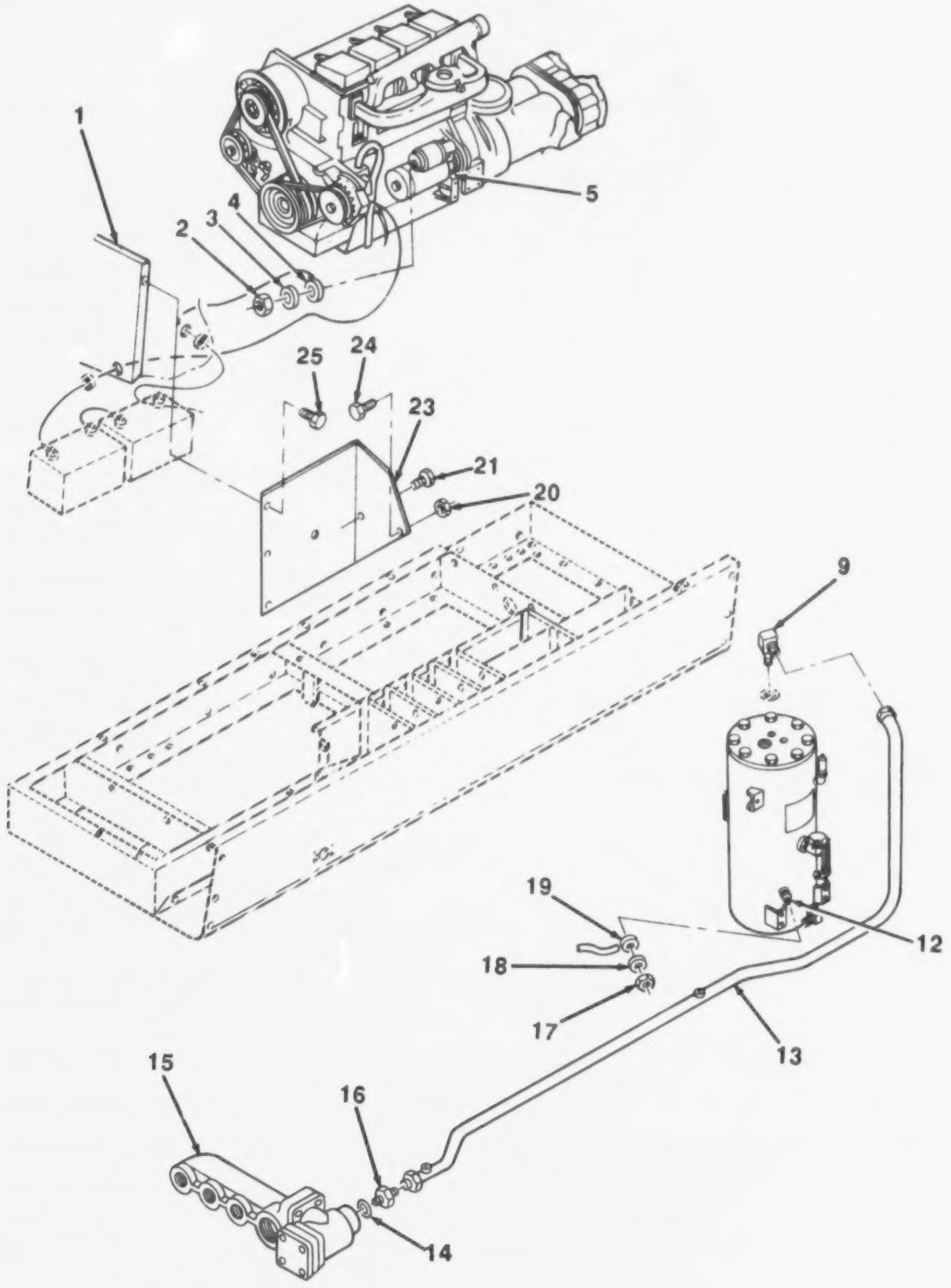
4-101. AIR DISCHARGE TUBE ASSEMBLY REPLACEMENT (Con't).



TA505556

4-101. AIR DISCHARGE TUBE ASSEMBLY REPLACEMENT (Con't).

3. Connect air discharge tube assembly (13) to elbow (9). Connect adapter (16) and new preformed packing (14) to minimum pressure service valve (15).

4. Connect air discharge tube assembly (13) to adapter (16).

5. Position side baffle assembly (23) and battery cable (4) in place and install 3 screws (24) and nuts (20).

6. Install 3 screws (25) in side baffle assembly (23) and front baffle assembly (1).

7. Install battery cable (4) on starter solenoid (5) with nut (2) and new lockwasher (3).

8. Install 2 screws (21) in side baffle assembly (23).

9. Install wire (19), new lockwasher (18), and nut (17) on pressure transmitter (12).

FOLLOW-ON TASKS:

- Install batteries (see paragraph 4-57).
- Close access door assembly.
- Close left door assembly.

4-102. HOSE REEL ASSEMBLY MAINTENANCE.

THIS TASK COVERS

a. Removal
b. Disassembly
c. Assembly
d. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- System air pressure relieved.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- Two retaining rings
- Six preformed packings
- Twelve lockwashers

a. REMOVAL

WARNING

Ensure that system air pressure is relieved before removing hose reel. Compressed air can result in injury to personnel.

1. Remove coupling half (10), 2 elbows (11), and 2 nipples (12 and 13) from angle valve (16).

NOTE

Support hose reels when removing capscrews.

2. Remove 4 capscrews (19), 2 capscrews (18), 6 lockwashers (17), hose reel (14), and bearing retaining plate (9) from bearing unit housing (6). Discard lockwashers.
3. Repeat steps 1 and 2 to remove remaining hose reel.

b. DISASSEMBLY

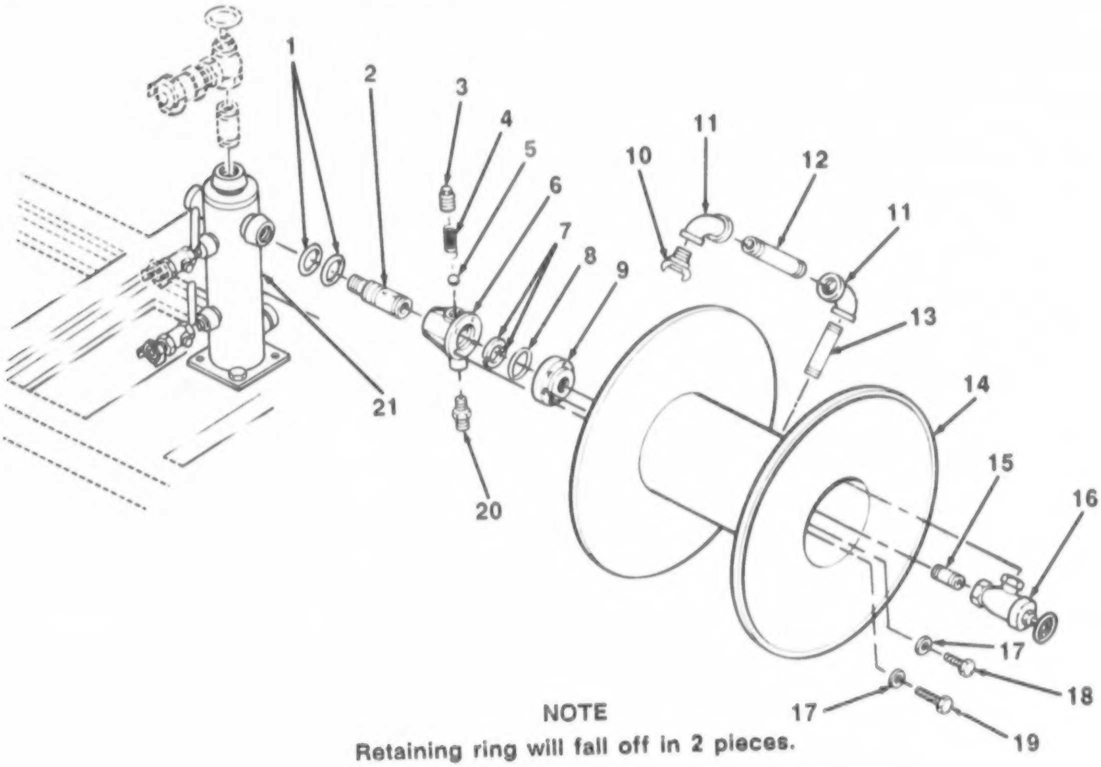
1. Remove angle valve (16), nipple (15), and preformed packing (8) from bearing retaining plate (9). Discard preformed packing.

NOTE

Spring is under tension. Remove plug slowly.

2. Remove plug (3), spring (4), and retard ball (5) from bearing unit housing (6).
3. Push bearing unit housing (6) toward hose reel support bracket (21) and remove retaining ring (7) from adapter (2). Discard retaining ring.
4. Remove bearing unit housing (6) from adapter (2).
5. Remove grease fitting (20) from bearing unit housing (6).
6. Remove adapter (2) from hose reel support bracket (21).
7. Remove 2 preformed packings (1) from adapter (2). Discard preformed packings.
8. Repeat steps 1 through 7 and disassemble the remaining hose reel.

4-102. HOSE REEL ASSEMBLY MAINTENANCE (Con't).



NOTE

Retaining ring will fall off in 2 pieces.

c. ASSEMBLY

1. Install adapter (2) and 2 new preformed packings (1) on hose reel support bracket (21).
2. Install bearing unit housing (6) on adapter (2).
3. Position new retaining ring (7) on adapter (2) and pull bearing unit housing (6) away from hose reel support bracket (21) and over retaining ring.
4. Install grease fitting (20), retard ball (5), spring (4), and plug (3) in bearing housing unit (6).
5. Install nipple (15), angle valve (16), and new preformed packing (8) in bearing retaining plate (9).
6. Repeat steps 1 through 5 to assemble remaining hose reel.

d. INSTALLATION

NOTE

Ensure that angle valve is positioned so nipple can be installed through opening in hose reel.

1. Position hose reel (14) on bearing retaining plate (9) and install 2 capscrews (18) and 2 new lockwashers (17).
2. Position bearing retaining plate (9) on bearing unit housing (6) and install 4 capscrews (19) and 4 new lockwashers (17).

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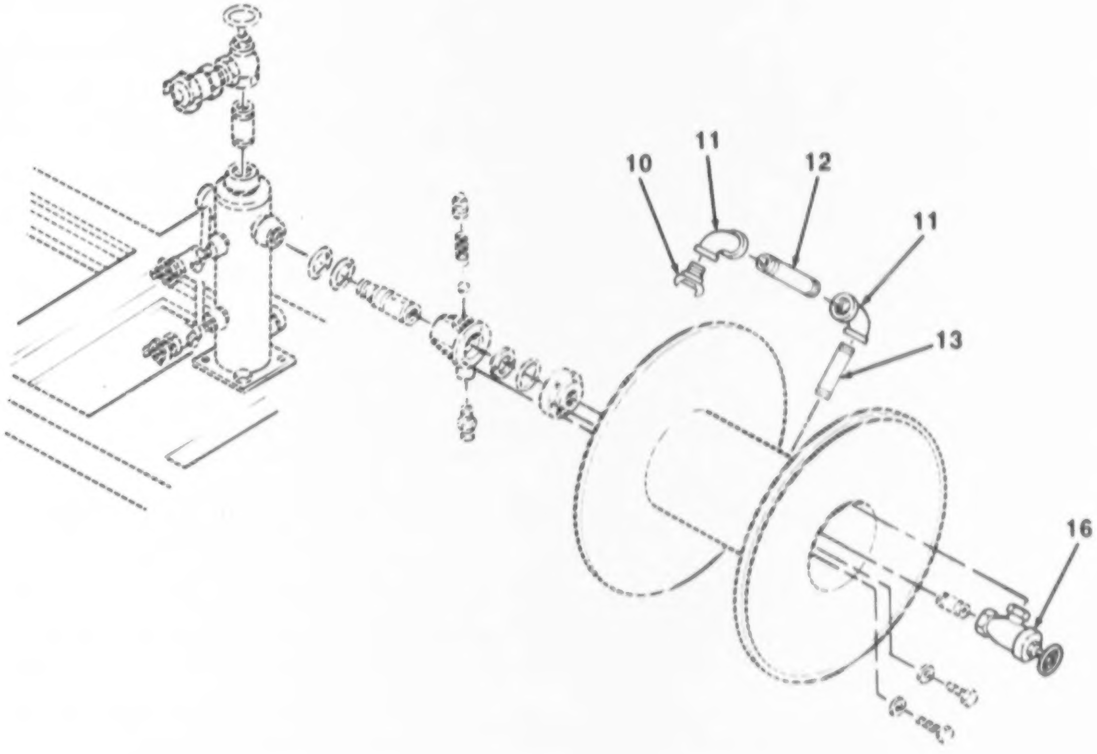
4-102. HOSE REEL ASSEMBLY MAINTENANCE (Con't).

3. Install coupling half (10), 2 elbows (11), and 2 nipples (12 and 13) in angle valve (16).

4. Repeat steps 1 through 3 to install remaining hose reel.



TA505558

4-103. HOSE REEL ASSEMBLY SUPPORT BRACKET AND COUPLING REPLACEMENT.

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SETUP

Equipment Conditions:

- Engine off.
- System air pressure relieved.
- Hose reels removed (see paragraph 4-102).

Materials/Parts:

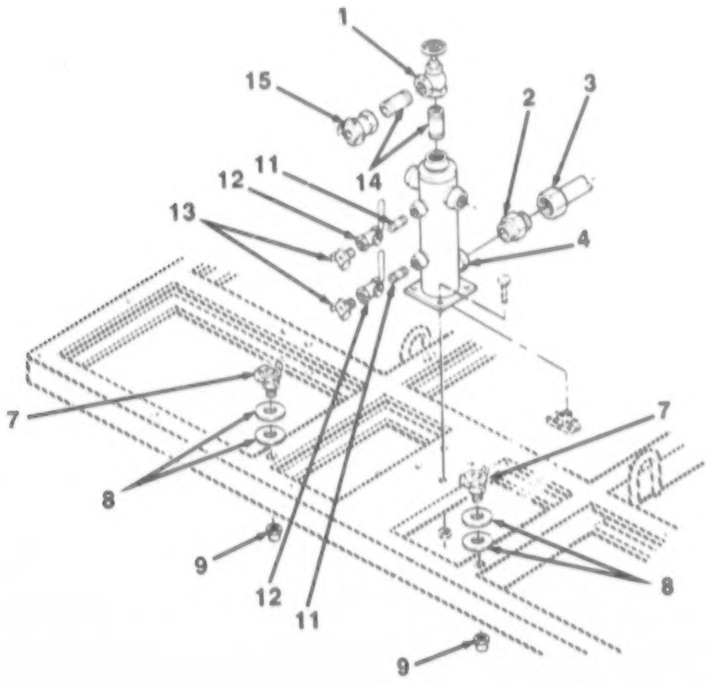
- Four self-locking bolts
- Four self-locking nuts

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Disconnect air discharge hose assembly (3) from adapter (2). Remove adapter from hose reel support bracket (4).
2. Remove 2 pipe caps (9), 4 flatwashers (8), and 2 coupling halves (7) from frame.
3. Remove coupling half (15), 2 nipples (14), and angle valve (1) from hose reel support bracket (4).
4. Remove 2 coupling halves (13), ball valves (12), and nipples (11) from hose reel support bracket (4).



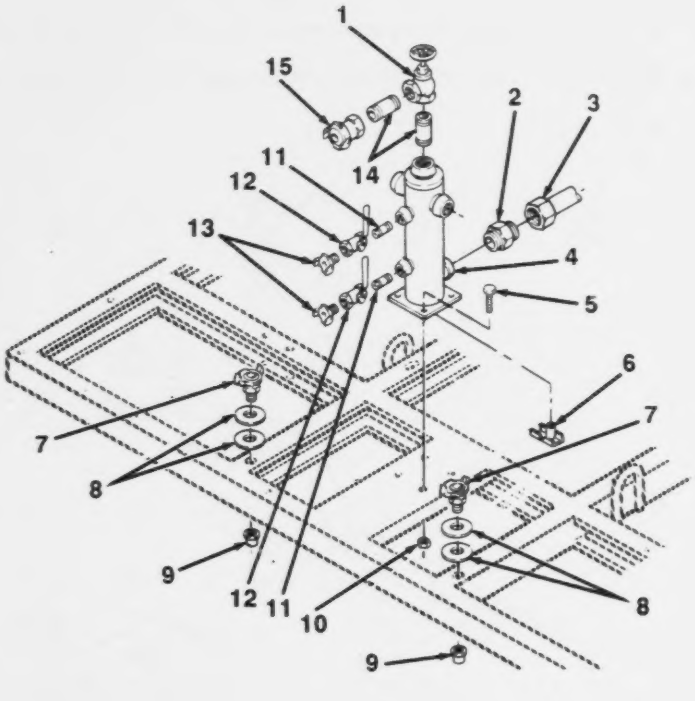
TA505559

4-103. HOSE REEL ASSEMBLY SUPPORT BRACKET AND COUPLING REPLACEMENT (Con't).

5. Remove 4 self-locking bolts (5), nuts (10), and hose reel support bracket (4) from frame. Discard self-locking bolts and nuts.
6. Remove drain cock (6) from bottom of hose reel support bracket (4).

b. INSTALLATION

1. Install drain cock (6) in bottom of hose reel support bracket (4).
2. Install 2 coupling halves (7), 4 flatwashers (8), and 2 pipe caps (9) on frame.
3. Position hose reel support bracket (4) in place on frame and install 4 new self-locking bolts (5) and nuts (10).
4. Install adapter (2) in hose reel support bracket (4). Connect air discharge hose assembly (3) to adapter.
5. Install 2 nipples (11), ball valves (12), and coupling halves (13) on hose reel support bracket (4).
6. Install 2 nipples (14), angle valve (1), and coupling half (15) on hose reel support bracket (4).



FOLLOW-ON TASKS:

- Install hose reels (see paragraph 4-102).

TA505560

Section XVI. PREPARATION FOR STORAGE OR SHIPMENT

Paragraph Number	Title	Page Number
4-104	Preservation	4-215
4-105	Preparation for Shipment	4-215

4-104. PRESERVATION.

a. **General.** If the unit is to be secured for a lengthy period of time, you must take preservation measures. The instructions in this manual and the instructions for special administrative storage found in TM 740-90-1 will enable you to properly preserve this compressor unit during an extended storage period.

b. **Engine Preservation.** To preserve the engine for storage, perform the following:

(1) Clean the outside of the engine with a reliable detergent or diesel fuel.

CAUTION

The anticorrosive oils used should conform to MIL-C-21260 or TL 9150-037/2 specifications or NATO Code C 640/642.

(2) Drain the oil from the sump, while the engine is still hot, and fill with an anticorrosive oil.

(3) Drain the fuel from the tank into a container. Mix it with a 10% anticorrosive solution and pour back into the tank. An alternative is to fill the tank with an injection pump testing oil that has corrosion inhibiting properties, for example, Calibration Fluid B.

(4) Run the engine for about 10 minutes. This will fill the pipes, filter, pump, and nozzles with the preservative mixture.

(5) Stop the engine. Remove the valve covers and injection pump covers, and spray the rocker chambers and the pump chambers with the preservative mixture. Install the valve covers.

(6) Turn the engine over several times by hand. This will spray the mixture into the combustion chamber.

(7) Close the intake and exhaust openings tightly.

NOTE

Make a list of all the preservative measures you take and place the list in the manual holder. These preservative measures will protect the engine for a period of six to twelve months, depending on weather and locale.

4-105. PREPARATION FOR SHIPMENT.

a. **General.** This unit can be transported by three different methods: 1) Towed by a vehicle, 2) By aircraft, railcar, or flatbed, or 3) External air transport by helicopter.

b. **Towing.** See paragraphs 2-15, 2-16, and TM 9-2320-272-10.

c. **Transport by Aircraft, Railcar, or Flatbed.** These three types of transportation are similar because in each circumstance the trailer must be maneuvered up a ramp and secured to the flat surface on which it rests.

(1) Maneuver the trailer up the ramp and into its final resting place.

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4-105. PREPARATION FOR SHIPMENT (Con't).

NOTE

Ensure that you leave enough room around the trailer for the tie-downs.

(2) Use the proper tie-down straps and secure the trailer, from the tie-down and lifting eyes, to the tie-down rings on the carrying vehicle.

d. **External Air Transport by Helicopter.**

(1) Maneuver the trailer to an area accessible by helicopter.

(2) Arrange the sling straps so the lift point is no more than 19 ft. (5.8 m) above the highest point of the trailer.

(3) Be sure the straps are arranged so the lift point is directly above the trailer's center of gravity.

NOTE

Spreader bars have not been developed for this equipment.

CHAPTER 5
DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

Section I. TROUBLESHOOTING PROCEDURES

Paragraph Number	Title	Page Number
5-1	General	5-1
5-2	Troubleshooting Symptom Index	5-1
Table 5-1	Direct Support and General Support Troubleshooting Procedures	5-2

5-1. GENERAL.

This section contains troubleshooting procedures to be performed by direct support/general support maintenance personnel. Malfunctions listed are the ones most likely to happen. Not all possible malfunctions can be foreseen and listed. Tests and inspections are listed to help you find the cause of the malfunction. The tests are arranged so that the easier tests are listed before the harder tests. Corrective actions are listed to help you eliminate the malfunction. Where the corrective action is too complicated to be listed in full detail, the paragraph number of the detailed procedure is given.

5-2. TROUBLESHOOTING SYMPTOM INDEX.

	Troubleshooting Procedure Page
COMPRESSOR	
Air cleaner filter element has oil spots	5-3
Air discharge pressure too low	5-3
Excessive oil carryover	5-2
Overheats	5-3
Will not build pressure (Safety relief valve relieves)	5-3
ENGINE	
Exhaust smokes excessively	5-2
Operates backward when turned off	5-2
Overheats	5-2
Performs poorly	5-2

Table 5-1. Direct Support and General Support Troubleshooting Procedures.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

ENGINE

1. **PERFORMS POORLY.**

Step 1. Check to see if fluid passage bolt on injection pump is working properly.

Replace fluid passage bolt (see paragraph 5-19).

Step 2. Check to see if valve spring is broken.

Replace valve spring (see paragraph 5-13).

Step 3. Check to see if fuel injector nozzle needles are dirty or sticking.

Clean or replace fuel injectors (see paragraph 5-19).

Step 4. Perform compression check (see paragraph 5-3).

Repair as necessary (see paragraph 5-6).

2. **EXHAUST SMOKES EXCESSIVELY.**

Step 1. If blue smoke is present, check to see if intake and exhaust valves are seating properly.

Repair cylinder head (see paragraph 5-7).

Step 2. If black smoke is present, check to see if fuel injectors are dirty or sticking, or fuel injection pump is defective.

Clean or replace fuel injectors (see paragraph 5-19).

Replace fuel injection pump (see paragraph 5-20).

Step 3. Perform compression check (see paragraph 5-3).

Repair as necessary (see paragraph 5-6).

3. **OPERATES BACKWARD WHEN TURNED OFF.**

Check to see if unloader valve is damaged.

Repair or replace unloader valve (see paragraph 5-39).

4. **OVERHEATS.**

Step 1. Check to see if fuel injectors are dirty, sticking, or defective.

Clean or replace fuel injectors (see paragraph 5-19).

Step 2. Check to see if fuel injection pump is working properly.

Replace fuel injection pump (see paragraph 5-20).

COMPRESSOR

1. **EXCESSIVE OIL CARRYOVER.**

Check to see if seal is damaged or leaking.

Replace seal (see paragraph 5-35).

Table 5-1. Direct Support and General Support Troubleshooting Procedures (Con't).

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

---

2. AIR CLEANER FILTER ELEMENT HAS OIL SPOTS.

Check to see if unloader valve is damaged.

Repair or replace unloader valve (see paragraph 5-39).

3. OVERHEATS.

Step 1. Check to see if oil temperature bypass valve is defective.

Repair or replace oil temperature bypass valve (see paragraph 5-36).

Step 2. Check to see if operating pressure is too high.

Repair or replace unloader valve (see paragraph 5-39).

4. AIR DISCHARGE PRESSURE TOO LOW.

Check to see if main unloader valve spring is broken.

Repair or replace unloader valve (see paragraph 5-39).

5. WILL NOT BUILD PRESSURE (SAFETY RELIEF VALVE RELIEVES).

Check to see if unloader valve is damaged.

Repair or replace unloader valve (see paragraph 5-39).

Section II. ENGINE MAINTENANCE

Paragraph Number	Title	Page Number
5-3	Engine Compression Check	5-5
5-4	Top Dead Center (TDC) Setting	5-6
5-5	Engine Replacement	5-8
5-6	Engine Block Repair	5-13
5-7	Cylinder Head Maintenance	5-18
5-8	Cylinder Replacement	5-21
5-9	Vibration Damper and V-belt Pulley Replacement	5-23
5-10	Crankshaft Replacement	5-25
5-11	Flywheel Maintenance	5-27
5-12	Pistons and Connecting Rods Maintenance	5-29
5-13	Valve Train Mechanism Maintenance	5-32
5-14	Timing Gears Replacement	5-34
5-15	Camshaft Replacement	5-36
5-16	Oil Pan Replacement	5-37
5-17	Oil Pump Replacement	5-38
5-18	Oil Lines Replacement	5-39

5-3. ENGINE COMPRESSION CHECK.

This Task Covers: Engine Compression Check

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit
- Auto fuel and electrical system repair tool kit

ENGINE COMPRESSION CHECK

1. Start and run engine without a load for 10 minutes (see paragraph 2-12).
2. Shut down the engine (see paragraph 2-13).
3. Remove fuel injector and install adapter, hose, and gage in place of fuel injector (see paragraph 5-19).
4. Start engine and record pressure reading of gage. Pressure should be between 290–406 psi (2000–2840 kPa). If pressure reading is not between 290–406 psi (2000–2840 kPa), disassemble engine block and repair as necessary (see paragraph 5-6).
5. Remove adapter, hose, and gage and install fuel injector (see paragraph 5-19).
6. Repeat steps 1 through 5 and check compression in the 3 remaining cylinders.

FOLLOW-ON TASKS:

- Close left door assembly.

5-4. TOP DEAD CENTER (TDC) SETTING.

This Task Covers: Top Dead Center (TDC) Setting

Initial Setup:

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Front baffle assembly removed (see paragraph 5-27).

Tools/Test Equipment:

- General mechanic's tool kit
- Degree indicator (003-0498)
- Dial indicator (003-0543)
- TDC fixture (003-0498)
- TDC pointer (003-0678)

TOP DEAD CENTER (TDC) SETTING

NOTE

Use this procedure when either the flywheel or crankshaft pulley have been replaced, or the timing marks cannot be seen.

1. Remove No. 1 valve cover (see paragraph 4-12).
2. Set No. 1 cylinder valves in overlap position (see paragraph 4-13).
3. Using 36 mm socket and breaker bar, turn crankshaft (8) clockwise one full revolution, then turn ¼-turn more.
4. Install TDC fixture (5) in place on No. 1 cylinder head (7).
5. Turn T-handle (1) and depress rocker arm (6) 0.197–0.236 in. (5–6 mm).
6. Install dial indicator (3) in TDC fixture (5). Preset dial indicator load at 7 mm, and tighten locknut (2).
7. Install degree indicator (10) on crankshaft pulley (11). Install TDC pointer (12) behind engine front cover bolt (9).
8. Turn crankshaft (8) clockwise until rocker arm (6) moves dial indicator pointer (4). Continue to turn crankshaft slowly until dial indicator pointer reverses direction, then stop.
9. Set dial indicator pointer (4) at zero.
10. Position degree indicator (10) on crankshaft pulley (11) with TDC pointer (12) set at zero.
11. Turn crankshaft (8) counterclockwise until dial indicator pointer (4) completes one full revolution, and is pointing exactly 0.1 mm (10 graduations) past zero on dial indicator (3).
12. Record the position indicated by the TDC pointer (12) on the dial indicator (3).
13. Turn crankshaft clockwise until dial indicator pointer completes one full revolution and is pointing exactly 0.1 mm (10 graduations) past zero on the dial indicator (3).
14. Record the position indicated by the TDC pointer (12) on the degree indicator (10).

NOTE

Top dead center (TDC) is the middle of the two positions recorded in steps 12 and 14.

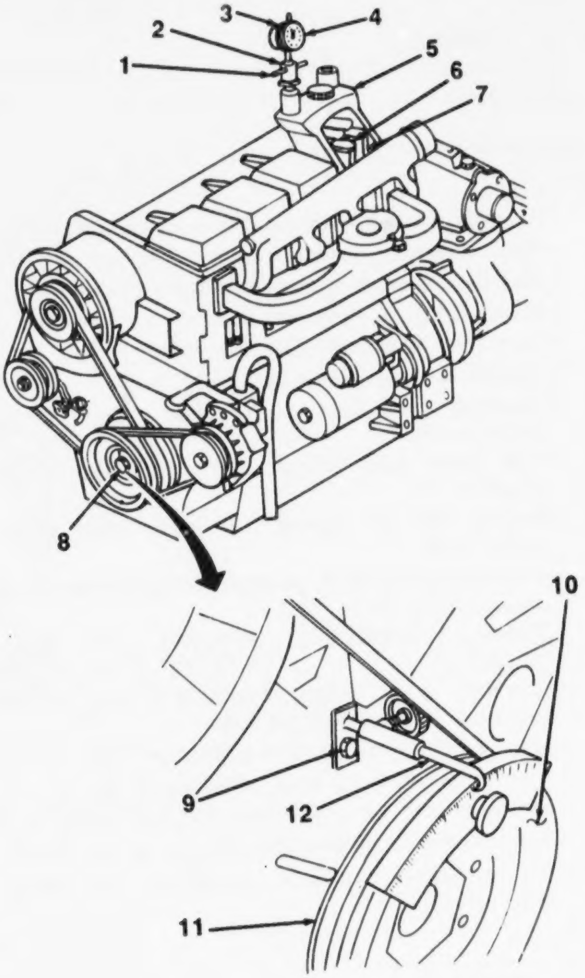
15. Find the average of the two positions recorded in steps 12 and 14.

5-4. TOP DEAD CENTER (TDC) SETTING (Con't).

NOTE

If start of fuel injection timing must be done, do not move TDC pointer or degree indicator.

16. Turn crankshaft (8) until TDC pointer (12) is lined up with average mark found in step 15. No. 1 piston is now at top dead center (TDC).
17. Position degree indicator (10) on crankshaft pulley (11) so TDC pointer (12) is lined up with zero.
18. Remove TDC fixture (5) and dial indicator (3) from No. 1 cylinder head (7).
19. Install No. 1 valve cover (see paragraph 4-12).
20. Remove TDC pointer (12) and degree indicator (10).



FOLLOW-ON TASKS:

- Install front baffle assembly (see paragraph 5-27).
- Close left and right door assemblies.

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5-5. ENGINE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Storage batteries removed (see paragraph 4-57).
- Roof assembly removed (see paragraph 5-31).
- Exhaust manifold removed (see paragraph 4-14).
- Intake manifold removed (see paragraph 4-15).
- Oil cooler removed (see paragraph 4-17).
- Oil line removed (see paragraph 4-20).
- Metering fuel pump removed (see paragraph 4-22).
- Fuel lines and fittings removed (see paragraph 4-24).
- Engine throttle control removed (see paragraph 4-25).
- Engine stop cable at governor disconnected (see paragraph 4-29).
- Blower assembly fan removed (see paragraph 4-32).
- Cowling, duct, guide rail, shield, and plates removed (see paragraph 4-34).
- Idler pulley removed (see paragraph 4-35).
- Alternator removed (see paragraph 4-36).
- Starter motor removed (see paragraph 4-39).
- Belt break switch removed (see paragraph 4-42).
- Oil temperature switch removed (see paragraph 4-43).

Equipment Conditions (Con't):

- Solenoid valve removed (see paragraph 4-59).
- Compressor oil lines and fittings disconnected (see paragraph 4-86).
- Unloader valve assembly removed (see paragraph 4-90).
- Compressor fan and fan drive removed (see paragraph 4-92).
- Blowdown valve removed (see paragraph 4-95).
- Fuel injection pump and governor removed (see paragraph 5-20).

Materials/Parts:

- Three resilent mounts
- Nine lockwashers

Tools/Test Equipment:

- General mechanic's tool kit
- Hoist, 2000 lb. minimum capacity
- Sling, 2000 lb. minimum capacity
- Two lifting eyebolts (Fabricated, Appendix G)

Personnel Required: Two

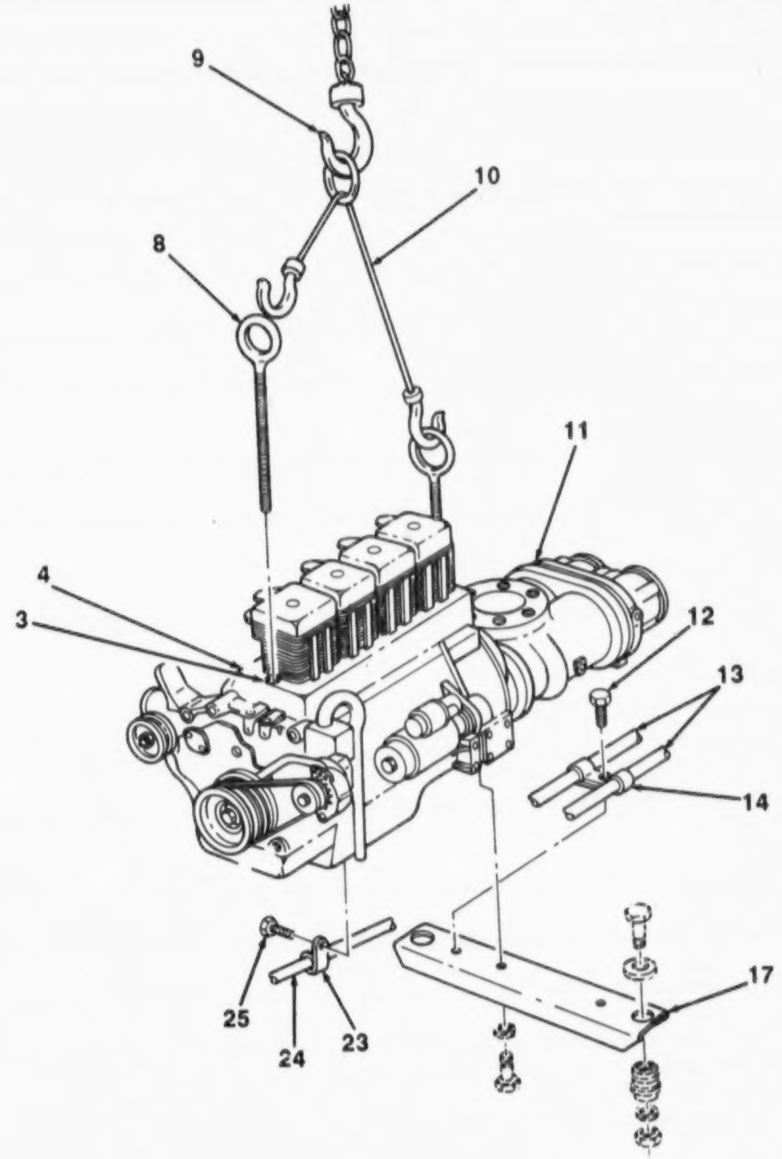
a. REMOVAL

CAUTION

Engine and compressor must be removed as a complete unit. Compressor mounting bracket supports rear of the engine. If engine and compressor are separated before removal, major damage to engine, compressor, and trailer can result.

1. Install lifting eyebolts (8) in threaded holes (3) at each end of engine (4).
2. Position hoist (9) in place over engine (4) and compressor (11). Attach lifting sling (10) to lifting eyebolts (8) and hoist. Take up slack in lifting sling and hoist.
3. Remove screw (12), 2 loop clamps (14), and wiring harness (13) from mounting bracket (17).
4. Remove screw (25), 2 loop clamps (23), and 2 wiring harnesses (24) from side of engine (4).

5-5. ENGINE REPLACEMENT (Con't).



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5-5. ENGINE REPLACEMENT (Con't).

5. Remove screw (7), loop clamp (6), and belt break switch electrical lead (5) from front cover of engine (4).

6. Remove 2 capscrews (15), washers (16), lockwashers (19), and nuts (20) from mounting bracket (17). Discard lockwashers.

7. Remove capscrew (1), washer (30), lockwasher (29), and nut (28) from mounting bracket (2). Discard lockwasher.

NOTE

After removal from trailer, do not support or rest engine and compressor on mounting brackets.

8. Using hoist (9), raise engine (4) and compressor (11) out of trailer and lower onto suitable supports.

9. Remove 4 bolts (27), lockwashers (26), and mounting bracket (2) from engine (4). Discard lockwashers.

10. Remove 2 capscrews (21), lockwashers (22), and mounting bracket (17) from compressor (11). Discard lockwashers.

11. Remove 3 resilent mounts (18) from mounting brackets (2 and 17). Discard resilent mounts.

12. Remove lifting sling (10), hoist (9), and 2 lifting eyebolts (8) from engine (4).

NOTE

To remove compressor from engine, see paragraph 5-35.

b. INSTALLATION

1. Install lifting eyebolts (8) in threaded holes (3) at each end of engine (4).

2. Position mounting bracket (17) in place under compressor (11) and install 2 capscrews (21) and new lockwashers (22).

3. Install 3 new resilient mounts (18) in mounting brackets (2 and 17).

4. Position mounting bracket (2) in place on engine (4), and install 4 bolts (27) and new lockwashers (26).

5. Using hoist (9), raise engine (4) and compressor (11) off supports and lower in place in trailer.

6. Line up mounting holes in mounting brackets (2 and 17) and frame. Install 2 capscrews (15), flatwashers (16), new lockwashers (19), and nuts (20) in mounting bracket (17).

7. Install capscrew (1), flatwasher (30), new lockwasher (29), and nut (28) in mounting bracket (2).

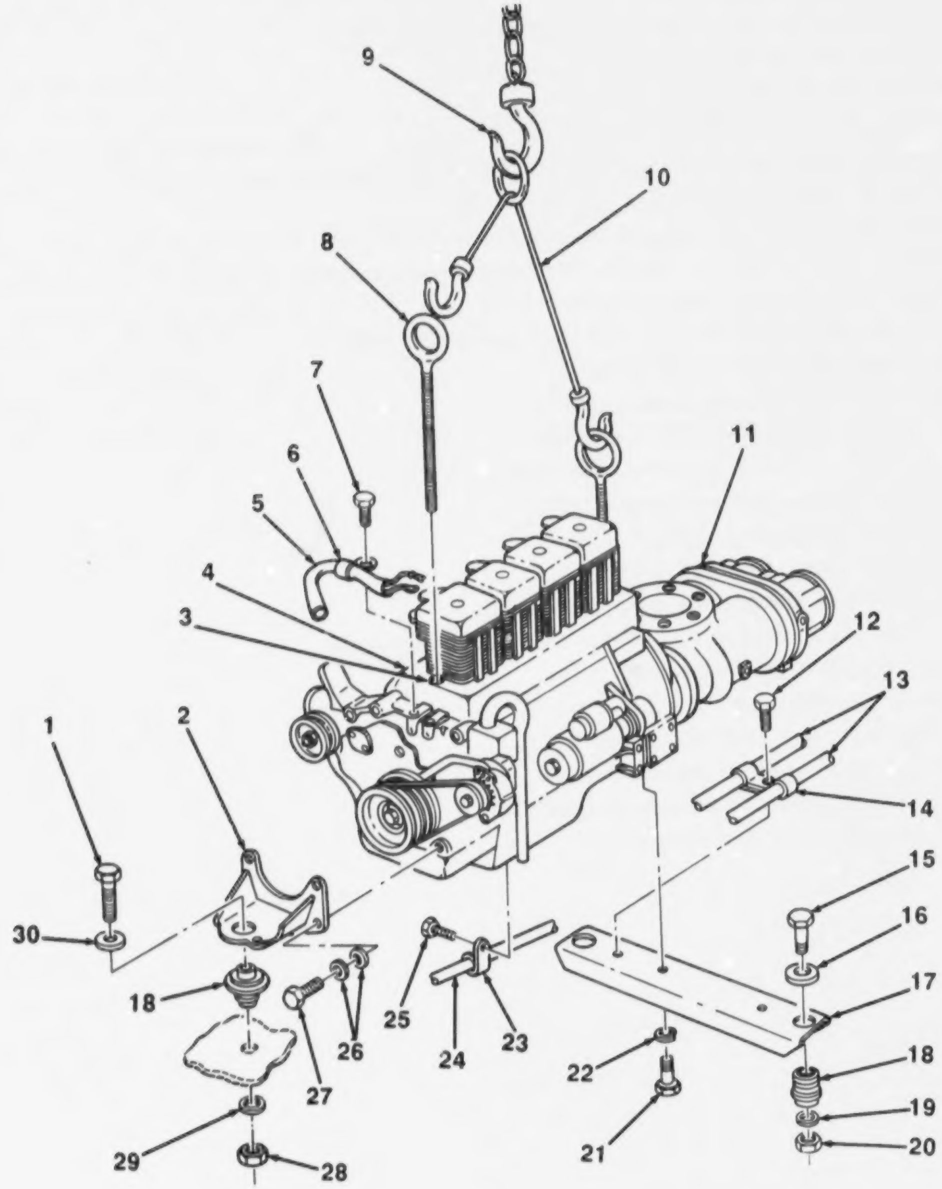
8. Install screw (7), loop clamp (6), and belt break switch electrical lead (5) on front cover of engine (4).

9. Install screw (25), 2 loop clamps (23), and wiring harness (24) in place on side of engine (4).

10. Install screw (12), loop clamp (14), and 2 wiring harnesses (13) in place on mounting bracket (17).

11. Remove lifting sling (10), hoist (9), and 2 lifting eyebolts (8) from engine (4).

5-5. ENGINE REPLACEMENT (Con't).



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5-5. ENGINE REPLACEMENT (Con't).

FOLLOW-ON TASKS:

- Install oil line (see paragraph 4-20).
- Install fuel injection pump and governor (see paragraph 5-20).
- Install metering fuel pump (see paragraph 4-22).
- Install solenoid valve (see paragraph 4-59).
- Install oil filter base assembly (see paragraph 4-19).
- Install unloader valve assembly (see paragraph 4-90).
- Install oil cooler (see paragraph 4-17).
- Install engine throttle control (see paragraph 4-25).
- Install cowling, duct, guide rail, shield, and plates (see paragraph 4-34).
- Install blower assembly fan (see paragraph 4-32).
- Connect engine stop cable at governor (see paragraph 4-29).
- Install idler pulley (see paragraph 4-35).
- Install belt break switch (see paragraph 4-42).
- Install oil temperature switch (see paragraph 4-43).
- Install compressor fan and fan drive (see paragraph 4-92).
- Install blowdown valve (see paragraph 4-35).
- Install starter motor (see paragraph 4-39).
- Install alternator (see paragraph 4-36).
- Install fuel lines and fittings (see paragraph 4-24).
- Connect compressor oil lines and fittings (see paragraph 4-86).
- Install intake manifold (see paragraph 4-15).
- Install exhaust manifold (see paragraph 4-14).
- Install storage batteries (see paragraph 4-57).
- Install roof assembly (see paragraph 5-31).
- Install door assemblies (see paragraph 5-28).
- Close left and right door assemblies.

5-6. ENGINE BLOCK REPAIR.

This Task Covers:

a. Disassembly

b. Assembly

Initial Setup:

Equipment Conditions:

- Engine off.
- Engine removed (see paragraph 5-5).
- Vibration damper and V-belt pulley removed (see paragraph 5-9).
- Air compressor removed (see paragraph 5-35).

Tools/Test Equipment:

- General mechanic's tool kit
- Electric drill
- Oil nozzle tool (003-1798)
- Twist bit drill

Materials/Parts:

- One encased plain seal
- One shaft seal
- Four cylinder oil spray nozzles
- Six preformed packings
- Eleven lockwashers

5-6. ENGINE BLOCK REPAIR (Con't).

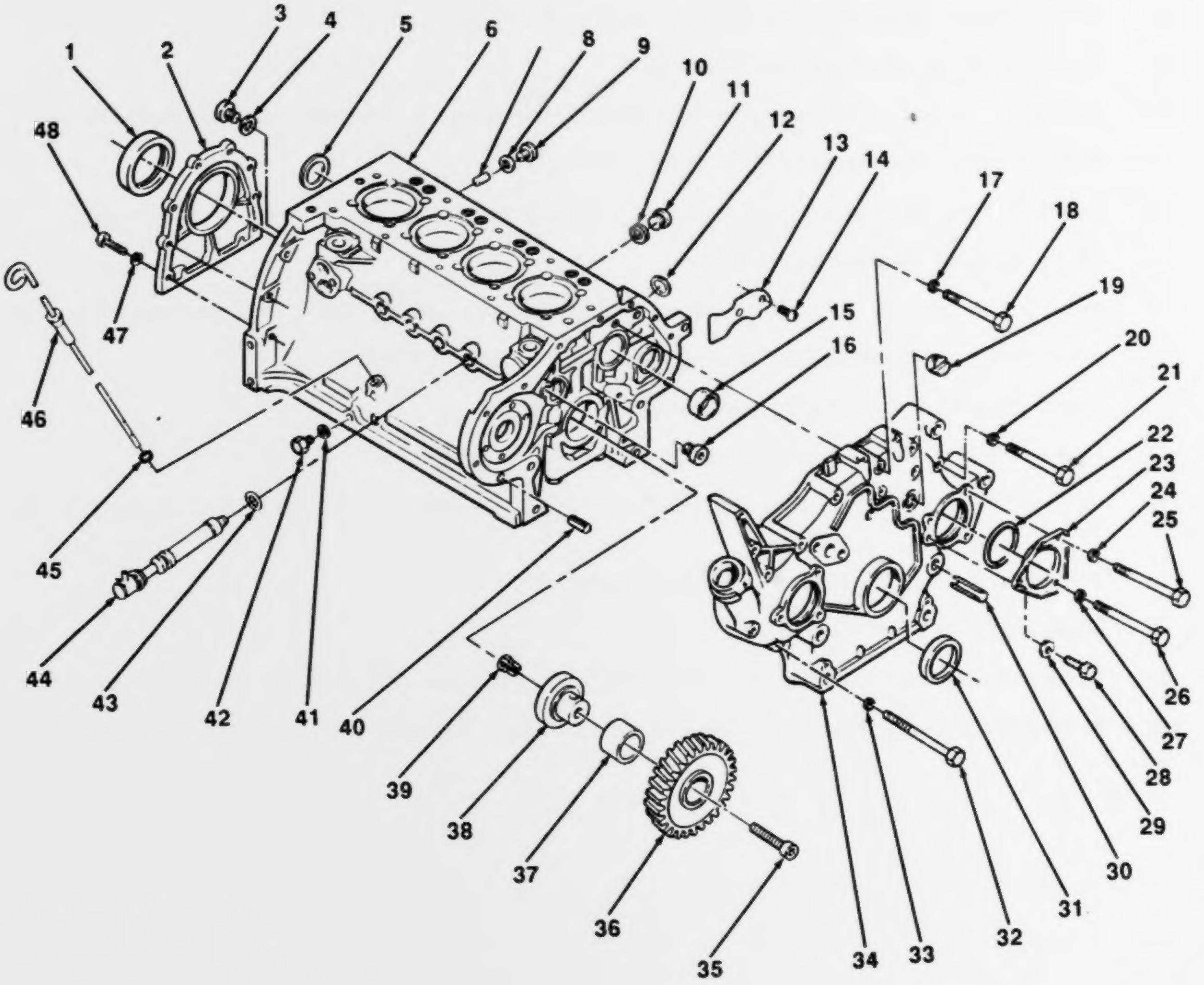
a. DISASSEMBLY

1. Remove bolts (25 and 26) and lockwashers (24 and 27) from cover (23) and front cover (34). Discard lockwashers.
2. Remove bolt (28), lockwasher (29), cover (23), and preformed packing (22) from front cover (34). Discard preformed packing.
3. Remove plug (19) from front cover (34).
4. Inspect dowel sleeve (30) for damage. Replace if necessary.
5. Remove encased plain seal (31) from front cover (34). Discard encased plain seal.
6. Remove bolts (18, 21, and 32) and washers (17, 20, and 33) from front cover (34).
7. Remove front cover (34) from engine block (6).
8. Remove oil pump suction pipe (see paragraph 5-18).
9. Remove oil pump and drive gear (see paragraph 5-17).
10. Remove allen head screw (35) and idler gear assembly (36).
11. Remove sleeve bushing (37), roller bearing (38), and sleeve bushing (39) from idler gear assembly (36).
12. Remove camshaft (see paragraph 5-15).
13. Drill and tap 4 cylinder oil spray nozzles (44). Install oil nozzle tool and remove 4 cylinder oil spray nozzles and preformed packings (43). Discard cylinder oil spray nozzles and preformed packings.
14. Remove plug (42) and washer (41) from engine block (6).
15. Remove 8 bolts (48), lockwashers (47), and rear cover (2). Discard lockwashers.
16. Remove shaft seal (1) from rear cover (2). Discard shaft seal.
17. Remove plug (3) and washer (4) from engine block (6).
18. Remove expansion plug (5).
19. Remove 5 plugs (9), washers (8), and plugs (7).
20. Remove plug (11) and washer (10).
21. Remove core hole plug (12) from engine block (6).
22. Remove screw (14) and deflector plate (13).
23. Remove bushing (15) from engine block (6).
24. Remove plug (16) and dowel pin (40) from engine block (6).
25. Remove dipstick (46) and preformed packing (45). Discard preformed packing.

b. ASSEMBLY

1. Install dipstick (46) and new preformed packing (45).

5-6. ENGINE BLOCK REPAIR (Con't).



2. Install plug (16) and dowel pin (40) in engine block (6).
3. Install deflector plate (13) and screw (14). Install bushing (15) in engine block (6) with oil holes lined up.
4. Install core hole plug (12) in engine block (6).
5. Install plug (11) and washer (10) in engine block (6).

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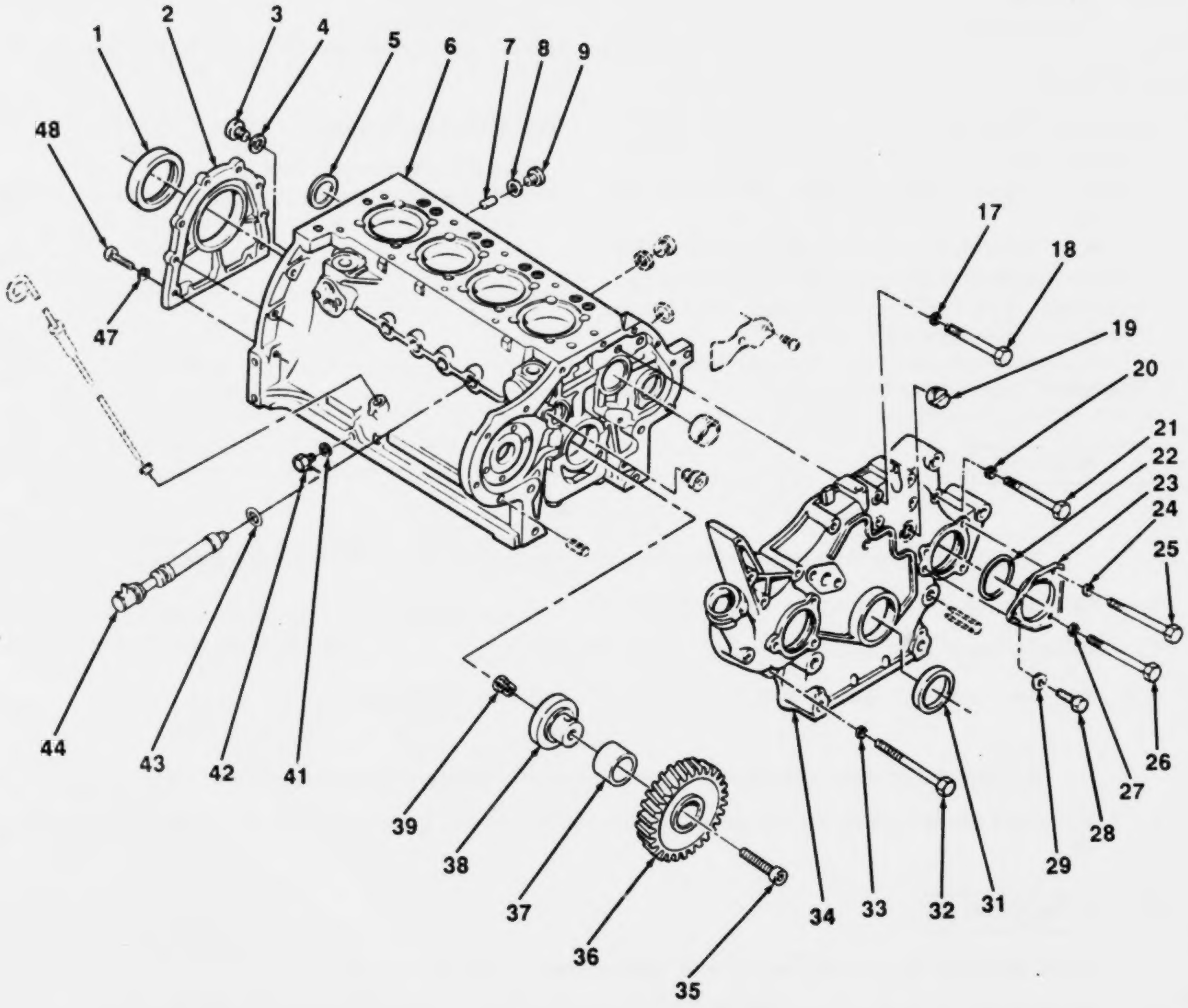
5-6. ENGINE BLOCK REPAIR (Con't).

6. Install 5 plugs (9), washers (8), and plugs (7).
7. Install expansion plug (5) in engine block (6).
8. Install plug (3) and washer (4) in engine block (6).
9. Install new shaft seal (1) in rear cover (2).
10. Position rear cover (2) in place on engine block (6) and install 8 bolts (48) and new lockwashers (47).
11. Install plug (42) and washer (41) in engine block (6).
12. Install 4 new cylinder oil spray nozzles (44) and preformed packings (43) in engine block (6).
13. Install camshaft (see paragraph 5-15).
14. Install sleeve bushing (37), roller bearing (38), and sleeve bushing (39) in idler gear assembly (36).
15. Install idler gear assembly (36) and allen head screw (35) in oil pump.
16. Install oil pump and drive gear (see paragraph 5-17).
17. Install oil pump suction pipe (see paragraph 5-18).
18. Position front cover (34) in place on engine block (6). Install bolts (18, 21, and 32) and washers (17, 20, and 33).
19. Install new encased plain seal (31) in front cover (34).
20. Install plug (19) in front cover (34).
21. Install new preformed packing (22), cover (23), new lockwasher (29), and bolt (28) in front cover (34).
22. Install bolts (25 and 26) and new lockwashers (24 and 27) in cover (23) and front cover (34).

5-6. ENGINE BLOCK REPAIR (Con't).



FOLLOW-ON TASKS:

- Install air compressor (see paragraph 5-35).
- Install vibration damper and V-belt pulley (see paragraph 5-9).
- Install engine (see paragraph 5-5).

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5-7. CYLINDER HEAD MAINTENANCE.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).
- Exhaust manifold removed (see paragraph 4-14).
- Intake manifold removed (see paragraph 4-15).
- Cowling, duct, guide rail, shield, and plates removed (see paragraph 4-34).
- Fuel injector removed from cylinder head to be removed (see paragraph 5-19).

Tools/Test Equipment:

- General mechanic's tool kit
- Cylinder head stand (003-0562)

a. REMOVAL

NOTE

Use this task to remove any one of four cylinder heads. No. 1 cylinder head is shown.

1. Remove valve cover (see paragraph 4-12).
2. Remove valve train mechanism (see paragraph 5-13).
3. Remove 2 screw plugs (4) and washers (3) from cylinder head (8).

NOTE

Loosen 4 capscrews ½-turn at a time, moving diagonally from one to the other.

4. Remove 4 capscrews (6) and washers (7) from cylinder head (8). Remove cylinder head and spacer ring (9).

b. DISASSEMBLY

1. Press down on spring retainer (1) and remove valve cone halves (2).
2. Remove spring retainer (1), gasket (19), spring (18), and rotor (17) from cylinder head (8).
3. Remove retaining ring (16) and inlet valve (12) from cylinder head (8).
4. Repeat steps 1 and 2, and remove exhaust valve (11) from cylinder head (8).
5. Remove stud (14) and 3 studs (5).
6. Mount cylinder head (8) on cylinder head stand and remove valve seats (10 and 13).

NOTE

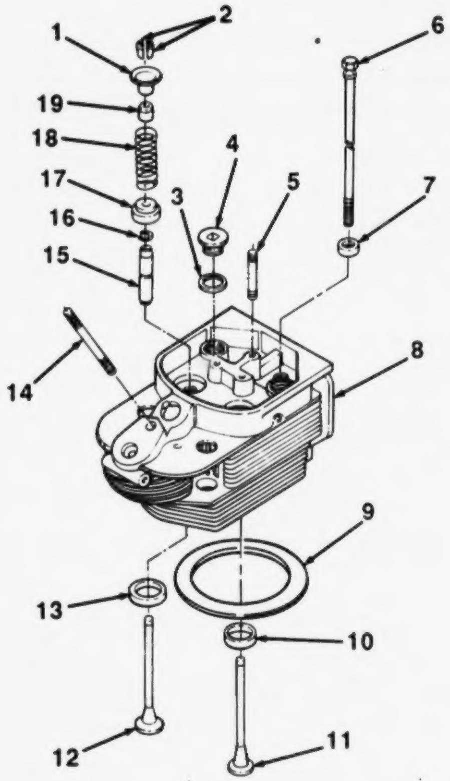
Remove valve guides out toward top of cylinder head.

7. Remove 2 valve guides (15) from cylinder head (8).

5-7. CYLINDER HEAD MAINTENANCE (Con't).

c. ASSEMBLY

1. Cool valve guides (15) and valve seats (10 and 13) to -80°F (-62°C).
2. Install valve guides (15), longer end first, from the top of cylinder head (8).
3. Install 2 new valve seats (10 and 13) in cylinder head (8). Remove cylinder head from cylinder head stand.
4. Install stud (14) and 3 studs (5) in cylinder head (8).
5. Position intake valve (12) in place in cylinder head (8). Install retaining ring (16).
6. Install rotor (17), spring (18), gasket (19), and spring retainer (1) in place on cylinder head (8).
7. Press down on spring retainer (1) and install valve cone halves (2).
8. Repeat steps 5 through 7, and install exhaust valve (11) in cylinder head (8).



d. INSTALLATION

1. Position spacer ring (9) and cylinder head (8) in place on cylinder.
2. Install 4 capscrews (6) and washers (7) in cylinder head (8) and tighten diagonally.
3. Install 2 screw plugs (4) and washers (3) in cylinder head (8). Tighten screw plugs to 58-65 lb.-ft. (80-90 N•m).
4. Install valve train mechanism (see paragraph 5-13).
5. Install valve cover (see paragraph 4-12).

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5-7. CYLINDER HEAD MAINTENANCE (Con't).

FOLLOW-ON TASKS:

- Install fuel injectors (see paragraph 5-19).
- Install cowling, duct, guide rail, shield, and plates (see paragraph 4-34).
- Install intake manifold (see paragraph 4-15).
- Install exhaust manifold (see paragraph 4-14).
- Connect battery cables (see paragraph 4-57).

5-8. CYLINDER REPLACEMENT.

This Task Covers:

a. Removal b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).
- Cylinder head removed (see paragraph 5-7).

Tools/Test Equipment:

- General mechanic's tool kit
- Micrometer
- Ring compressor

Materials/Parts:

- Petrolatum (Item 10, Appendix E)
- Lead wire (Item 13, Appendix E)
- Shims (as required)
- Spacer ring (as required)

a. REMOVAL

NOTE

Use this task to remove any one of 4 cylinders. No. 1 cylinder shown.

1. Using 36 mm socket and breaker bar, turn crankshaft until piston in cylinder (1) to be removed is at bottom dead center.

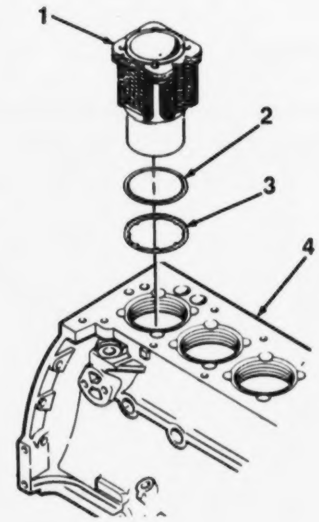
CAUTION

To prevent damage to piston or piston rings, do not allow piston or connecting rod to knock against engine block when removing cylinder.

2. Lift cylinder (1) out of engine block (4).
3. Remove spacer ring (3) and shim (2) from cylinder (1). If cylinder is defective and being replaced, discard spacer ring and shim.

b. INSTALLATION

1. Apply a thin coat of petrolatum on spacer ring (3) and shim (2). Install shim in groove in cylinder (1) and install spacer ring on cylinder.
2. Using 36 mm socket and breaker bar, turn crankshaft until piston in cylinder (1) to be installed is at top dead center.
3. Using ring compressor, compress piston rings.
4. Install cylinder (1) in place over piston and on engine block (4) so that inlet and exhaust port are facing left side of compressor unit.



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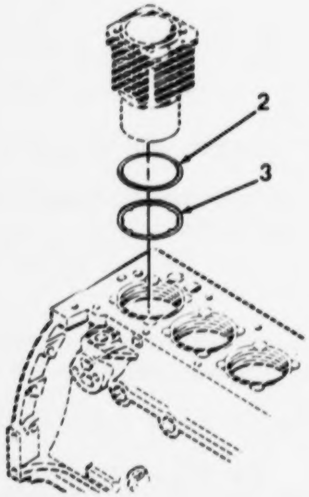
5-8. CYLINDER REPLACEMENT (Con't).

NOTE

- **If cylinder is new, perform steps 5 through 10.**
- **If cylinder is not new, go to step 11.**

5. Place a piece of 0.08 in. (2 mm) lead wire, cut to full width of piston crown, on piston crown at right angle to engine center line.
6. Install cylinder head (see paragraph 5-7).
7. Using 36 mm socket and breaker bar, turn crankshaft one complete revolution.
8. Remove cylinder head (see paragraph 5-7).
9. Measure both ends of lead wire with micrometer. The average compressed thickness of lead wire must be 0.040–0.047 in. (1.0–1.2 mm).
10. Add or remove shims (2) and spacer rings (3) as required to meet dimensions in step 9. Repeat steps 5 through 10 until dimension is correct.
11. Install cylinder head (see paragraph 5-7).



FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left and right door assemblies.

TA505568

5-9. VIBRATION DAMPER AND V-BELT PULLEY REPLACEMENT.

This Task Covers:

a. Removal
b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Battery cables disconnected (see paragraph 4-57).
- Alternator belt removed (see paragraph 4-37).
- Blower assembly fan belt removed (see paragraph 4-33).

Materials/Parts:

- Lubricating oil (Item 7, Appendix E)

Tools/Test Equipment:

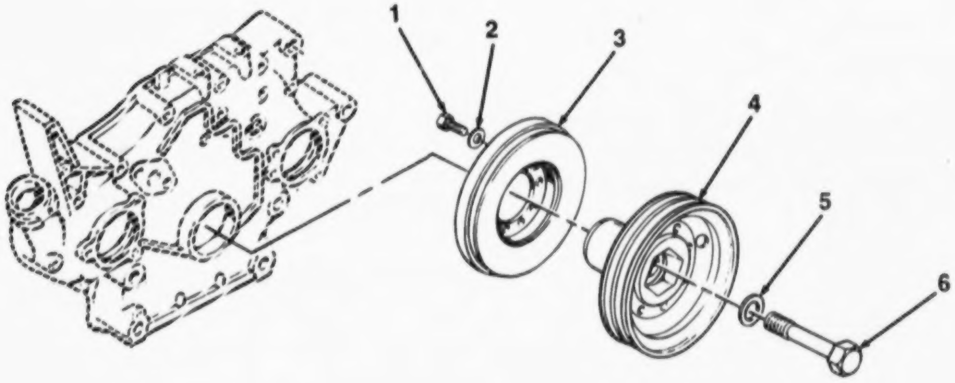
- General mechanic's tool kit
- Pulley holding tool (003-0446)

a. REMOVAL

NOTE

Pulley bolt has left-hand threads.

1. Using pulley holding tool, hold pulley (4) in place and remove bolt (6) and washer (5).
2. Remove pulley (4) and vibration damper (3).
3. Remove 8 bolts (1), washers (2), and vibration damper (3) from pulley (4).

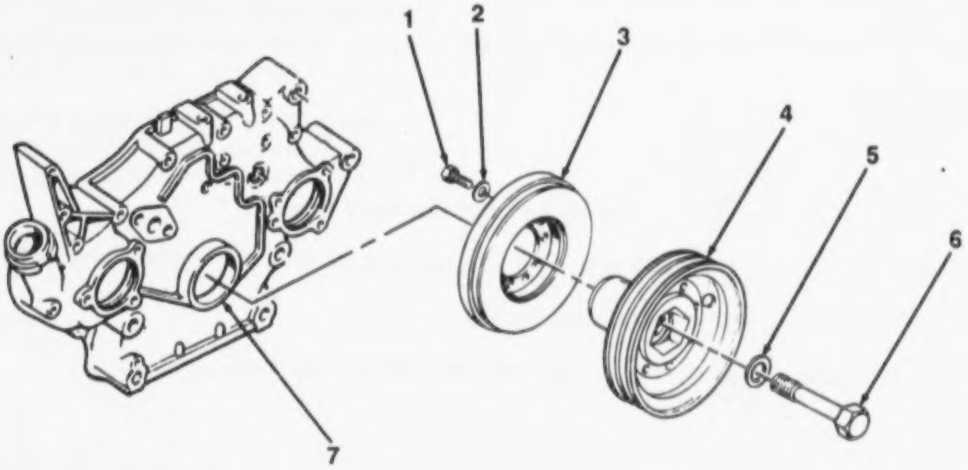


TA505569

5-9. VIBRATION DAMPER AND V-BELT PULLEY REPLACEMENT (Con't).

b. INSTALLATION

1. Position vibration damper (3) in place on pulley (4). Install 8 bolts (1) and washers (2).
2. Apply a light coat of lubricating oil on seal (7) in front cover.
3. Position pulley (4) on crankshaft gear so hole in pulley alines with pin in crankshaft gear.
4. Install bolt (6) and washer (5) in pulley (4).



FOLLOW-ON TASKS:

- Install blower assembly fan belt (see paragraph 4-33).
- Install alternator belt (see paragraph 4-37).
- Connect battery cables (see paragraph 4-57).

TA505570

5-10. CRANKSHAFT REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Vibration damper and V-belt pulley removed (see paragraph 5-9).
- Oil pan removed (see paragraph 5-16).
- Oil pump removed (see paragraph 5-17).

Tools/Test Equipment:

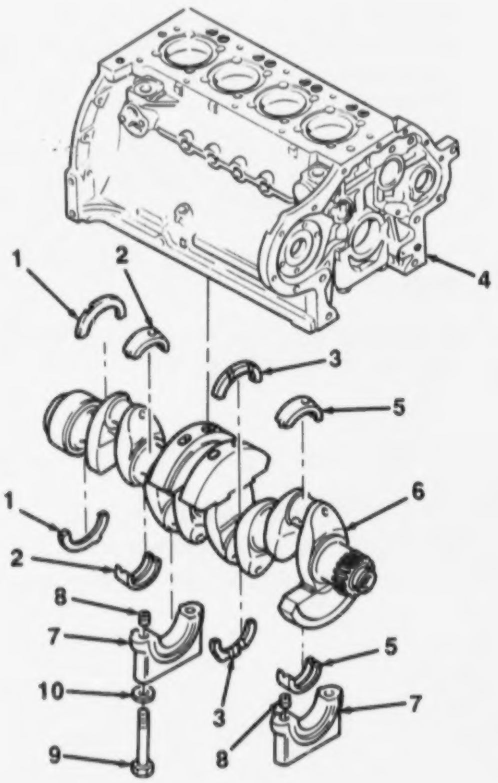
- General mechanic's tool kit

a. REMOVAL

1. Remove connecting rod bearing caps and bearing sleeves (see paragraph 5-12).
2. Remove 4 bolts (9), washers (10), and 2 crankshaft bearing caps (7) from engine block (4).
3. Remove crankshaft (6).
4. Inspect bushing dowels (8). Replace if necessary.
5. Remove main bearing halves (2 and 5) and thrust bearing halves (1 and 3).
6. Inspect main bearing halves (2 and 5) and thrust bearing halves (1 and 3) for scoring, wear, or damage. Replace if necessary.

b. INSTALLATION

1. Install plastigage in place on crankcase journals.
2. Install main bearing halves (2 and 5) in crankshaft bearing caps (7).

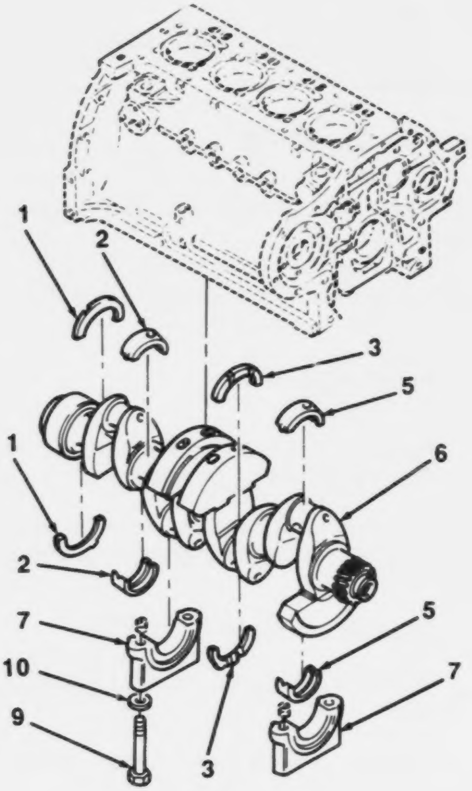


TA505571

5-10. CRANKSHAFT REPLACEMENT (Con't).

NOTE

- **Ensure that bushing dowels are installed.**
- **Ensure that ID numbers of caps match those stamped in crankcase.**



3. Install crankshaft bearing caps (7) and main bearing halves (2 and 5) on crankshaft (6).
4. Install thrust bearing halves (1 and 3) in place on rear main journal.
5. Position crankshaft (6) in place.
6. Install 4 bolts (9) and washers (10) in main bearing caps (7). Tighten bolts (9) as specified in Appendix F.
7. Remove bolts (9), washers (10) and 2 crankshaft bearing caps (7). Remove crankshaft (6), thrust bearing halves (1 and 3), main bearing halves (2 and 5), and plastigage.
8. Check thickness of plastigage with micrometer. Thickness should be between 0.0019-0.0043 in. (0.05-0.11 mm).
9. Repeat steps 2 through 6, then continue with step 10.
10. Install connecting rod bearing caps and bearing sleeves (see paragraph 5-12).

FOLLOW-ON TASKS:

- Install oil pump (see paragraph 5-17).
- Install oil pan (see paragraph 5-16).
- Install vibration damper and V-belt pulley (see paragraph 5-9).

TA505572

5-11. FLYWHEEL MAINTENANCE.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Equipment Conditions:

- Compressor coupling removed (see paragraph 5-38).

Tools/Test Equipment:

- General mechanic's tool kit
- Oven

Materials/Parts:

- One ring gear
- Seventeen lockwashers

a. REMOVAL

1. Remove 10 bolts (1) from flywheel (2).

WARNING

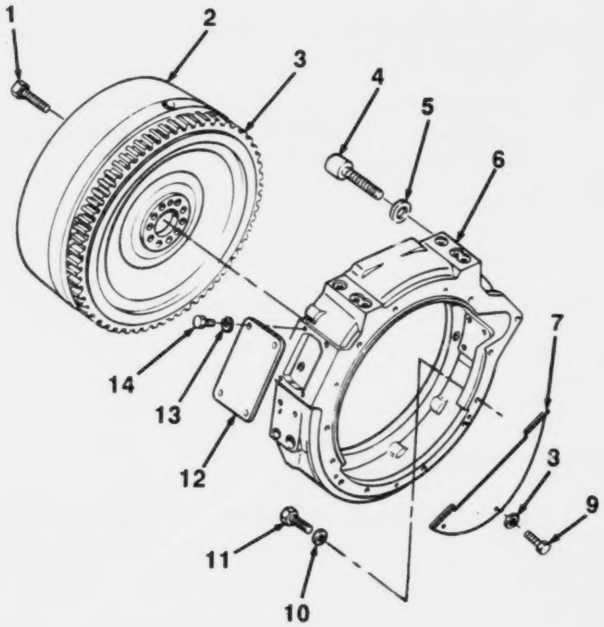
Flywheel is heavy and can injure you. To prevent injury, keep hands out from under flywheel while removing it.

2. Remove flywheel (2) from crankshaft and flywheel housing adapter (6).

3. Remove 9 bolts (11), lockwashers (10), socket head bolt (4), lockwasher (5), and flywheel housing adapter (6) from engine. Discard lockwashers.

4. Remove 4 bolts (14), lockwashers (13), and cover (12) from flywheel housing adapter (6). Discard lockwashers.

5. Remove 3 bolts (9), lockwashers (8), and cover plate (7) from flywheel housing adapter (6). Discard lockwashers.



b. DISASSEMBLY

1. Using a chisel, split ring gear (3) off flywheel (2). Discard ring gear.

c. ASSEMBLY

1. Place new ring gear (3) in oven and heat to 250°F (120°C) for 30 minutes.

TA505573

5-11. FLYWHEEL MAINTENANCE (Con't).

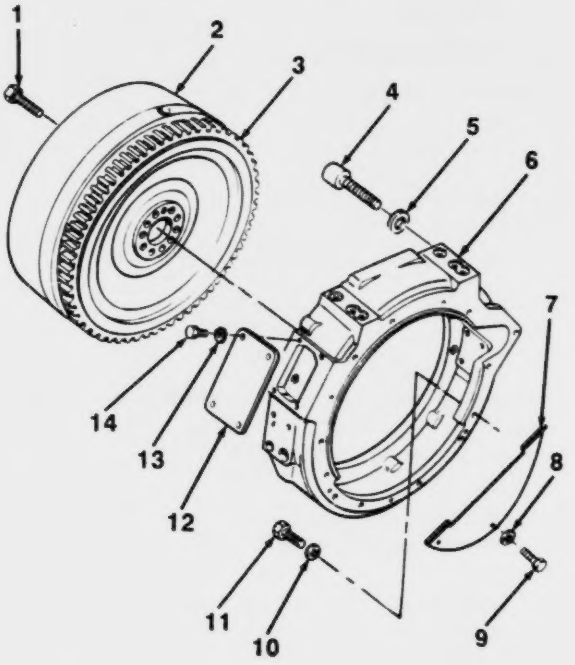
WARNING

Ring gear will be hot and can cause severe burns.

2. Remove ring gear (3) from oven and install in place on flywheel (2).

d. INSTALLATION

1. Position cover plate (7) in place and install 3 bolts (9) and new lockwashers (8).
2. Position cover (12) in place and install 4 bolts (14) and new lockwashers (13).
3. Position flywheel housing adapter (6) in place on engine. Install 9 bolts (11), new lockwashers (10), socket head bolt (4), and new lockwasher (5).
4. Position flywheel (2) in place in flywheel housing adapter (6).
5. Aline hole in flywheel (2) with alinement pin in crankshaft. Position flywheel in place on crankshaft and install 10 bolts (1).



FOLLOW-ON TASKS:

- Install compressor coupling (see paragraph 5-38).

TA505574

5-12. PISTONS AND CONNECTING RODS MAINTENANCE.

This Task Covers:

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

Initial Setup:

Equipment Conditions:

- Cylinder removed (see paragraph 5-8).
- Oil pan removed (see paragraph 5-16).
- Battery cables disconnected (see paragraph 4-57)

Tools/Test Equipment:

- General mechanic's tool kit.
- Feeler gage
- Oven
- Ring compressor
- Ring expander

Materials/Parts:

- Lubricating oil (Item 7, Appendix E)
- Rag (Item 11, Appendix E)
- Two bolts
- Two circlips
- Three piston rings

a. REMOVAL

NOTE

Use this task to remove any 1 of 4 pistons and connecting rods.

1. Remove 2 bolts (10) and connecting rod bearing cap (9). Discard bolts.

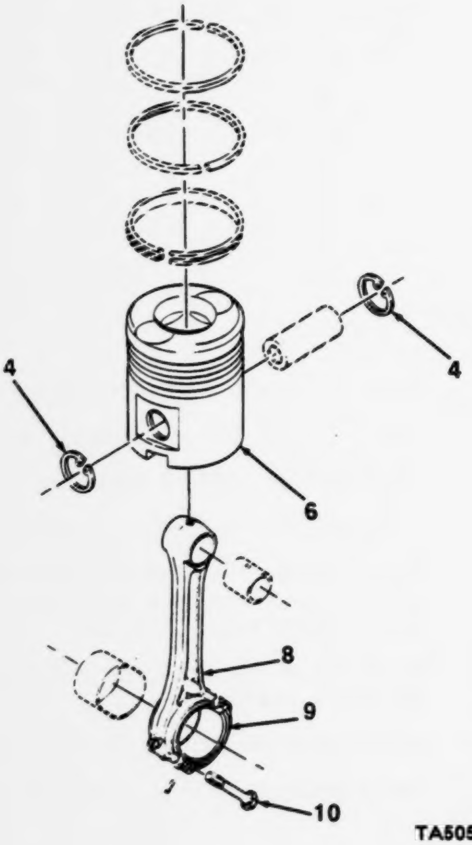
CAUTION

To prevent damage to piston or piston rings, do not allow piston or connecting rod to knock against engine block when removing piston and connecting rod.

2. Carefully lift piston (6) and connecting rod (8) out of engine block.

b. DISASSEMBLY

1. Remove 2 circlips (4) from pistons (6). Discard circlips.



TA505575

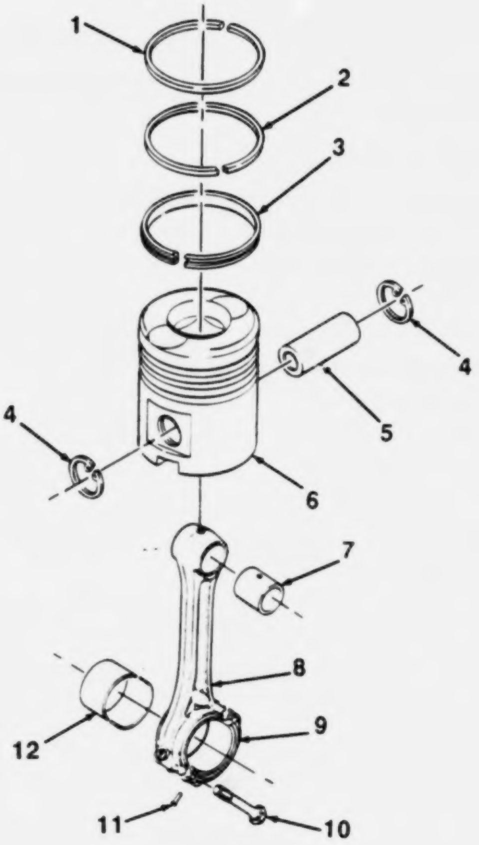
5-12. PISTONS AND CONNECTING RODS MAINTENANCE (Con't).

2. Place piston (6) and connecting rod (8) in oven, and heat to 176°F (80°C) for 30 minutes.

WARNING

Piston and connecting rod will be hot and can cause severe burns.

3. Remove piston (6) and connecting rod (8) from oven and place in piston cradle.
4. Drive piston pin (5) out of piston (6) and connecting rod (8).
5. Using ring expander, remove double trapezoidal compression ring (1), tapered compression ring (2), and oil control ring (3) from piston (6). Discard rings.
6. Remove piston pin bushing (7) and bearing sleeve halves (12) from connecting rod (8).
7. Remove alining pin (11) from connecting rod (8).



c. ASSEMBLY

1. Clean grooves in piston (6). Using ring expander and new rings as follows:
   (a) TOP GROOVE – Double trapezoidal compression ring.
   (b) MIDDLE GROOVE – Tapered compression ring. Install with "top" facing up.
   (c) BOTTOM GROOVE – Oil control ring.
2. Insert new double trapezoidal compression ring (1) and tapered compression ring (2) in cylinder one at a time and check gap with feeler gage. Gap for compression rings (1 and 2) should be 0.35–0.55 mm (0.014–0.022 in.).
3. Insert new oil control ring (3) in cylinder and check gap with feeler gage. Gap should be 0.25–0.40 mm (0.0098–0.0157 in.).
4. Install piston pin bushing (7) and bearing sleeve halves (12) in connecting rod (8).
5. Install alining pin (11) in connecting rod (8).

TA505576

5-12. PISTONS AND CONNECTING RODS MAINTENANCE (Con't).

NOTE

Ensure that piston is installed on connecting rod so when installed on crankshaft, the arrow on crown of piston points to the push rod side of cylinder.

6. Position piston (6) on connecting rod (8). Install piston pin (5) in piston.

7. Install 2 new circlips (4) in piston (6).

d. INSTALLATION

1. Apply a light coat of lubricating oil on face of piston (6) and piston rings (1, 2, and 3). Using ring compressor, compress piston rings.

2. Position piston (6) and connecting rod (8) in engine block so that the arrow on the crown of piston points to the push rod side of engine block.

3. Position connecting rod (8) on crankshaft and install 2 new bolts (10) and connecting rod bearing cap (9). Tighten bolts as required by Appendix F.

FOLLOW-ON TASKS:

- Install cylinder head (see paragraph 5-7).
- Install fuel injectors (see paragraph 5-19).
- Install cowling, duct, guide rail, shield, and plate (see paragraph 4-34).
- Install intake manifold (see paragraph 4-15).
- Install exhaust manifold (see paragraph 4-14).
- Install oil pan (see paragraph 5-16).
- Connect battery cables (see paragraph 4-57).

5-13. VALVE TRAIN MECHANISM MAINTENANCE.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Battery cables disconnected (see paragraph 4-57.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- Two lockwashers
- Two preformed packings

a. REMOVAL

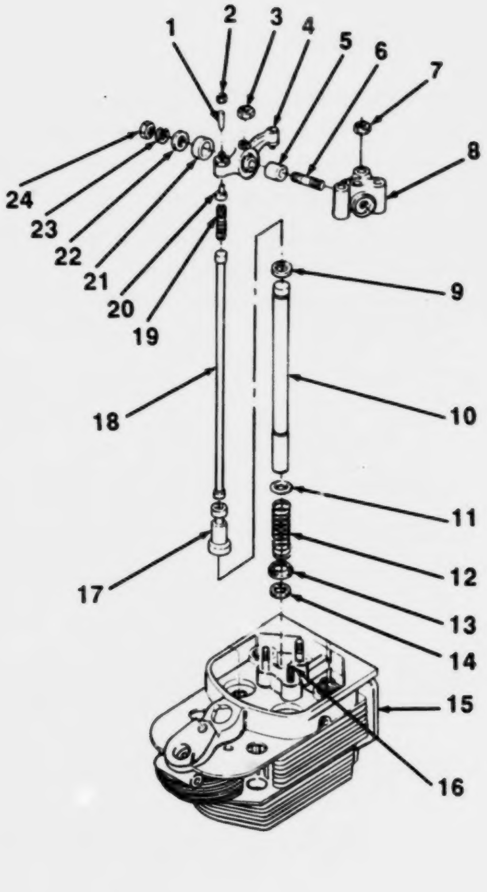
NOTE

Use this task to remove any 1 of 4 valve train mechanisms. No. 1 valve train location is shown.

1. Remove valve cover (see paragraph 4-12).
2. Remove 3 nuts (7) from rocker arm bracket (8) and cylinder head studs (16).
3. Remove rocker arm bracket (8) from cylinder head (15).

b. DISASSEMBLY

1. Remove 2 nuts (24), lockwashers (23), and washers (22) from rocker arm bracket (8). Discard lockwashers.
2. Remove 2 rocker arms (4) and shafts (5) from rocker arm bracket (8).
3. Inspect 2 studs (6) in rocker arm bracket (8) for cracks, bends, or stripped threads. Replace studs if necessary.
4. Remove 2 bushings (21) from rocker arms (4).
5. Remove 2 nuts (3), adjusting screws (19), and thrust pads (20) from rocker arms (4).
6. Remove 2 nuts (2) and oil nozzles (1) from rocker arms (4).



TA505577

5-13. VALVE TRAIN MECHANISM MAINTENANCE (Con't).

7. Remove 2 push rods (18) from cylinder head (15) and 2 access covers (10).
8. Push down on access covers (10) to depress springs (12), then remove 2 access covers (10), flatwashers (9 and 11), springs, caps (13), and preformed packings (14). Discard preformed packings.
9. Remove tappets (17) (see paragraph 5-15).

c. ASSEMBLY

1. Install tappets (17) (see paragraph 5-15).
2. Using spring compressor, assemble 2 caps (13) and springs (12) and install on access covers (10).
3. Install 2 flatwashers (9 and 11) and 2 new preformed packings (14).
4. Install 2 access covers (10) and remove spring compressors.
5. Install 2 push rods (18) in cylinder head (15) and access covers (10).
6. Install 2 oil nozzles (1) and nuts (2) in rocker arms (4).
7. Install 2 thrust pads (20), adjustable screws (19), and nuts (3) in rocker arms (4).

NOTE

Ensure that bushing oil holes are lined up with rocker arm oil holes.

8. Install 2 bushings (21) in rocker arms (4).

NOTE

Perform step 9 if studs were removed.

9. Install 2 studs (6) in rocker arm bracket (8).
10. Install 2 shafts (5), rocker arms (4), 2 washers (22), new lockwashers (23), and nuts (24) on studs (6).

d. INSTALLATION

1. Install rocker arm bracket (8) in place on cylinder head studs (16).
2. Install 3 nuts (7).
3. Adjust valve clearance (see paragraph 4-13).
4. Install valve cover (see paragraph 4-12).

FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left and right door assemblies.

5-14. TIMING GEARS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine set to top dead center (see paragraph 5-4).
- Front cover removed (see paragraph 5-6).

Tools/Test Equipment:

- General mechanic's tool kit
- Arbor press

Materials/Parts:

- One preformed packing
- Three lockwashers

a. REMOVAL

IDLER GEAR

1. Remove allen head screw (5) from idler gear (4).
2. Remove idler gear (4).
3. Using an arbor press, remove sleeve bushing (3) from idler gear (4).
4. Remove sleeve bushing (1) from roller journal bearing (2).

INJECTION PUMP DRIVE GEAR

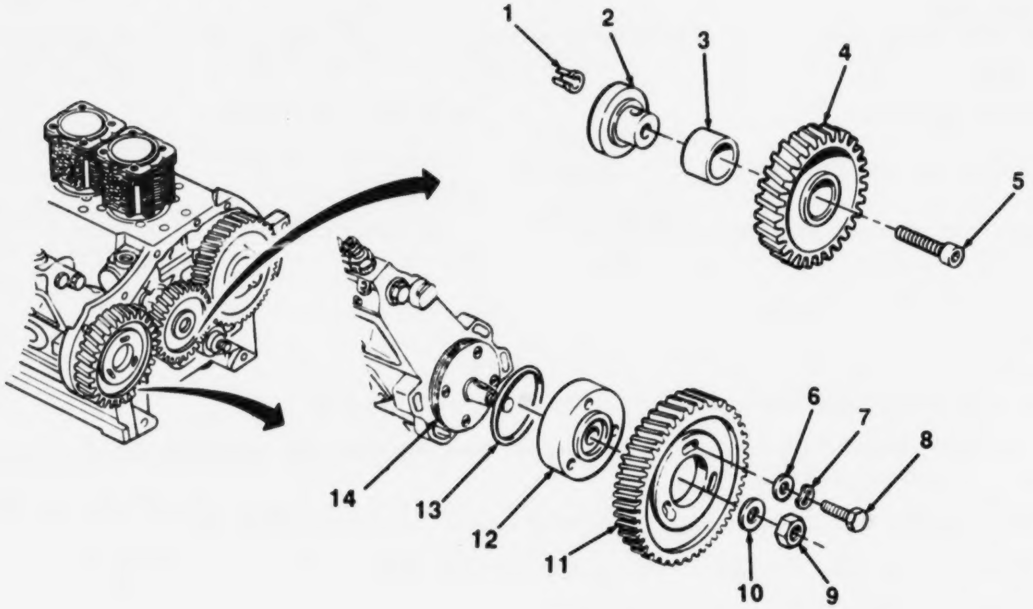
1. Remove 3 bolts (8), lockwashers (7), and washers (6) from drive gear (11) and body hub (12). Discard lockwashers.
2. Remove nut (9), washer (10), drive gear (11), body hub (12), and preformed packing (13) from fuel injection pump (14). Discard preformed packing.

b. INSTALLATION

INJECTION PUMP DRIVE GEAR

1. Position new preformed packing (13), body hub (12), and drive gear (11) in place on fuel injection pump (14).
2. Install, but do not tighten, nut (9) and washer (10).
3. Install 3 bolts (8), new lockwashers (7), and washers (6) in drive gear (11) and body hub (12). Tighten nut (9).

5-14. TIMING GEARS REPLACEMENT (Con't).



IDLER GEAR

1. Install sleeve bushing (1) in roller journal bearing (2).
2. Using arbor press, install sleeve bushing (3) in idler gear (4).
3. Install roller journal bearing (2) in idler gear (4).

NOTE

When installing idler gear, ensure that sleeve bushing is installed with the split facing toward the top of the engine.

4. Position idler gear (4) in place with timing marks alined.
5. Install allen head screw (5) in idler gear (4). Tighten allen head screw as required in Appendix F.

FOLLOW-ON TASKS:

- Install front cover (see paragraph 5-6).
- Install engine (see paragraph 5-5).

TA505578

5-15. CAMSHAFT REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine set to top dead center (see paragraph 5-4).
- Front cover removed (see paragraph 5-6).

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

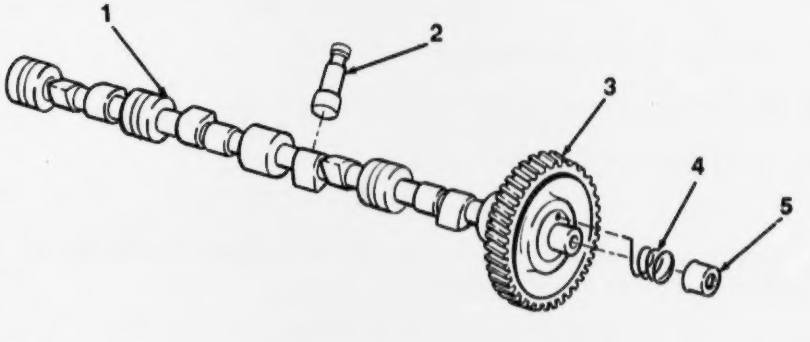
- Lubricating oil (Item 7, Appendix E)

a. REMOVAL

NOTE

- **The engine must be upside down to perform this task.**
- **If required for valve train mechanism maintenance (see paragraph 5-13), only perform step 3.**

1. Remove stop cap (5) and spring (4) from camshaft (1) and sprocket (3).
2. Remove camshaft (1) and sprocket (3) from engine block.
3. Remove tappets (2) from engine block.



b. INSTALLATION

1. Install tappets (2) in engine block.
2. Apply a light coat of lubricating oil to camshaft journals. Install camshaft (1) and sprocket (3) in engine block.
3. Install spring (4) and stop cap (5) in place on camshaft (1) and sprocket (3).

FOLLOW-ON TASKS:

- Install front cover (see paragraph 5-6).

TA505579

5-16. OIL PAN REPLACEMENT.

This Task Covers:

a. Removal
b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Engine oil drained (see LO 5-4310-452-12).

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

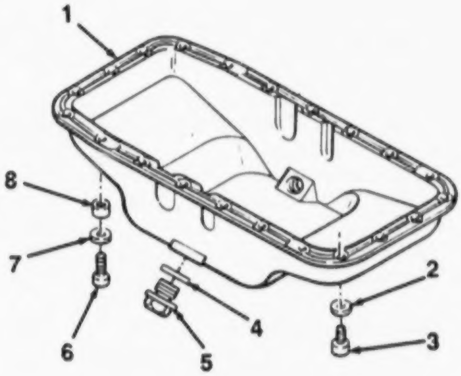
- Liquid gasket material (Item 6, Appendix E)
- One gasket

a. REMOVAL

NOTE

If engine has been removed, skip step 1.

1. Remove front belly pan (see paragraph 5-32).
2. Remove 20 capscrews (3) and washers (2) from oil pan (1).
3. Remove screw (6), washer (7), bushing (8), and oil pan (1) from engine block.
4. Remove plug (5) from oil pan (1).
5. Remove gasket (4) from plug (5). Discard gasket.



b. INSTALLATION

1. Install plug (5) and new gasket (4) in oil pan (1).

NOTE

Clear all surfaces of engine and oil pan before applying liquid gasket.

2. Apply a thin coat of liquid gasket material to mounting surface of oil pan (1).
3. Position oil pan (1) in place on engine block install 20 capscrews (3) and washers (2) in oil pan (1).
4. Install screw (6), washer (7), and bushing (8).

NOTE

If engine has been removed, skip step 5.

5. Install front belly pan (see paragraph 5-32).

FOLLOW-ON TASKS:

- Fill engine oil (see LO 5-4310-452-12).

TA505580

5-17. OIL PUMP REPLACEMENT.

This Task Covers:

a. Removal
b. Installation

Initial Setup:

Equipment Conditions:

- Front cover removed (see paragraph 5-6).

Tools/Test Equipment:

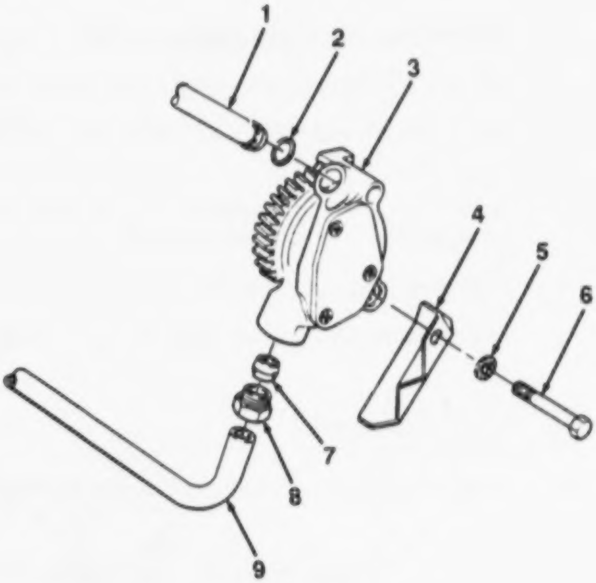
- General mechanic's tool kit

Materials/Parts:

- One lockwasher
- One preformed packing
- One tube coupling sleeve

a. REMOVAL

1. Unscrew and remove fitting (8) and suction pipe (9) from oil pump (3).
2. Remove tube coupling sleeve (7) from suction pipe (9). Discard tube coupling sleeve.
3. Remove bolt (6), lockwasher (5), and shield (4) from oil pump (3). Discard lockwasher.
4. Slide oil pump (3) away from discharge pipe (1) and remove oil pump.
5. Remove preformed packing (2) from end of discharge pipe (1). Discard packing.



b. INSTALLATION

1. Install new preformed packing (2) on end of discharge pipe (1).
2. Slide oil pump (3) in place on discharge pipe (1).
3. Install, but do not tighten, shield (4), new lockwasher (5), and bolt (6) on oil pump (3).
4. Rotate oil pump (3) clockwise until oil pump drive gear meshes with crankshaft drive gear. Tighten bolt (6).
5. Install new tube coupling sleeve (7) on suction tube (9). Install suction tube, fitting (8), and tube coupling sleeve in oil pump (3).

FOLLOW-ON TASKS:

- Install front cover (see paragraph 5-6).
- Install engine (see paragraph 5-5).

TA505581

5-18. OIL LINES REPLACEMENT.

This Task Covers:

a. Removal	b. Installation

Initial Setup:

Equipment Conditions:

- Front cover removed (see paragraph 5-6).
- Oil pan removed (see paragraph 5-16).
- Oil pump removed (see paragraph 5-17).

Tools/Test Equipment:

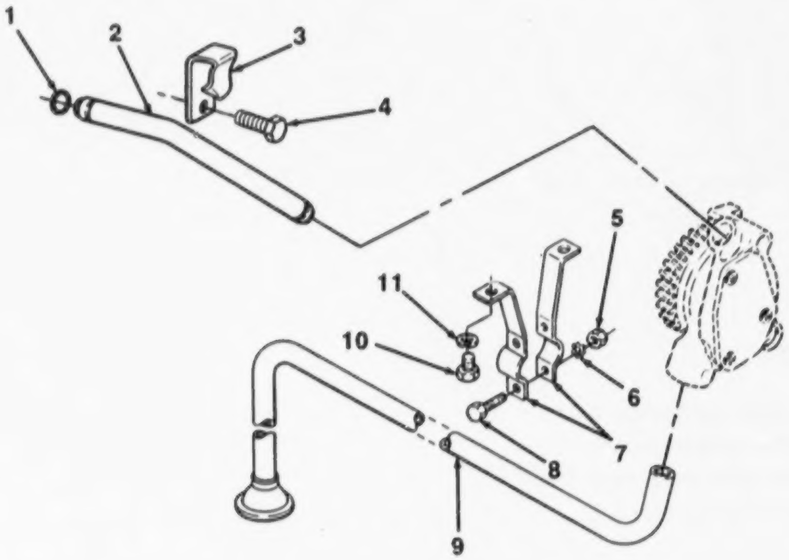
- General mechanic's tool kit

Materials/Parts:

- One preformed packing
- Four lockwashers

a. REMOVAL

1. Remove 2 bolts (8), lockwashers (6), and nuts (5) from pipe brackets (7). Discard lockwashers.
2. Remove suction pipe (9) from pipe brackets (7).
3. Remove capscrew (4) and yoke spring (3) from discharge pipe (2).
4. Pull discharge pipe (2) out of engine block.
5. Remove preformed packing (1) from discharge pipe (2). Discard preformed packing.
6. Remove 2 screws (10), lockwashers (11), and pipe brackets (7). Discard lockwashers.

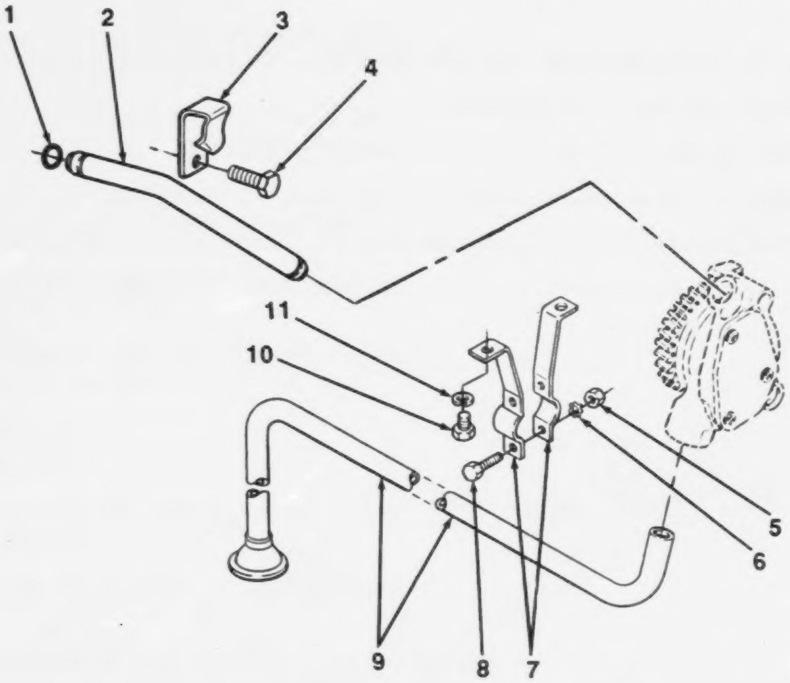


TA505582

5-18. OIL LINES REPLACEMENT (Con't).

b. INSTALLATION

1. Install new preformed packing (1) on engine block end of discharge pipe (2).
2. Install discharge pipe (2) in engine block.
3. Install yoke spring (3) and capscrew (4) on discharge pipe (2).
4. Install pipe brackets (7) with 2 screws (10) and new lockwashers (11).
5. Install suction pipe (9) in pipe brackets (7).
6. Install 2 bolts (8), new lockwashers (6), and nuts (5) in pipe brackets (7).



FOLLOW-ON TASKS:

- Install oil pump (see paragraph 5-17).
- Install oil pan (see paragraph 5-16).
- Install front cover (see paragraph 5-6).
- Install engine (see paragraph 5-5).

TA505583

Section III. FUEL SYSTEM MAINTENANCE

Paragraph Number	Title	Page Number
5-19	Fuel Injector Maintenance	5-41
5-20	Fuel Injection Pump Replacement	5-44

5-19. FUEL INJECTOR MAINTENANCE.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Test
e. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left door assembly open.

Tools/Test Equipment:

- General mechanic's tool kit
- Auto fuel and electrical system repair tool kit
- Injector puller (003-0422)

Materials/Parts:

- One joint washer

5-19. FUEL INJECTOR MAINTENANCE (Con't).

a. REMOVAL

NOTE

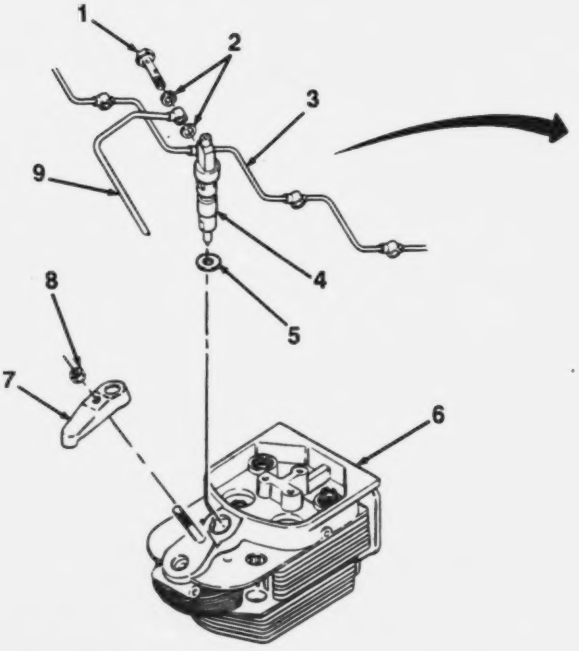
Use this task to remove any 1 of 4 fuel injectors.

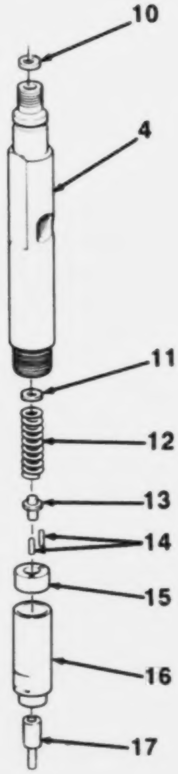
1. Remove fluid passage bolt (1) and 2 washers (2) from fuel injector (5).

NOTE

Perform step 2 for cylinders 1 and 4 only.

2. Remove fuel return line (17).
3. Disconnect fuel line (3) from fuel injector (4).
4. Remove nut (8) and yoke (7) from cylinder head (6).
5. Using injector puller, remove fuel injector (4) and joint washer (5) from cylinder head (6). Discard joint washer.





b. DISASSEMBLY

1. Remove nut (10) from fuel injector (4).
2. Unscrew fuel cooling sleeve (16) from fuel injector (4) and remove fuel injection nozzle (17).
3. Remove flatwasher (11), spring (12), plunger (13), and sleeve spacer (15) from fuel injector (4).
4. Inspect 2 straight pins (14) for cracks, bends, or damage. Replace if necessary.

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5-19. FUEL INJECTOR MAINTENANCE (Con't).

c. ASSEMBLY

1. Insert flatwasher (11) and spring (12) into fuel injector (4).
2. Insert plunger (13) with short side facing spring (12), into fuel injector (4).
3. Install sleeve spacer (15) with straight pins (14) inserted in holes of fuel injector (4).
4. Position fuel injection nozzle (17) in place on fuel injector (4) and install fuel cooling sleeve (16).

d. TEST

1. Install fuel injector (4) in tester.
2. Open valve to pressure gage.

NOTE

When pressure is 363-435 psi (2503-3000 kPa) less than opening pressure, the nozzle should not dribble.

3. Pump tester until fuel injector (4) opens and sprays.
4. Injector should open and spray at minimum pressure of 2537 psi (17593 kPa).

NOTE

If fuel injector opening pressure is not correct, perform steps 5 and 6.

5. Add joint washers (5) to increase, or remove washers to decrease opening pressure.
6. Repeat steps 1 through 4 and check spray pattern. Spray pattern should be solid with no mist around it. Nozzle should not dribble when fuel injector (4) closes.

e. INSTALLATION

1. Install fuel injector (4) in cylinder head (6).
2. Aline fuel injector (4) with fuel lines (3 and 9).
3. Install nut (10) on fuel injector (4).
4. Install yoke (7) and nut (8) on cylinder head (6).
5. Position fuel line (3) in place on fuel injector (4).

NOTE

Perform step 7 for cylinders 1 and 4 only.

6. Position fuel return line (9) in place.
7. Install fluid passage bolt (1) and 2 washers (2) in fuel injector (4).

FOLLOW-ON TASKS:

- Start engine and check for leaks (see paragraph 2-12).
- Shut down engine (see paragraph 2-13).
- Close left door assembly.

5-20. FUEL INJECTION PUMP REPLACEMENT.

This Task Covers:

a. Removal b. Installation

Initial Setup:

Equipment Conditions:

- Metering fuel pump removed (see paragraph 4-22).
- Solenoid valve removed (see paragraph 4-59).
- Idler pulley assembly removed (see paragraph 4-35).
- Battery cables disconnected (see paragraph 4-57).

Materials/Parts:

- One preformed packing
- One self-locking nut
- Four lockwashers

Tools/Test Equipment:

- General mechanic's tool kit

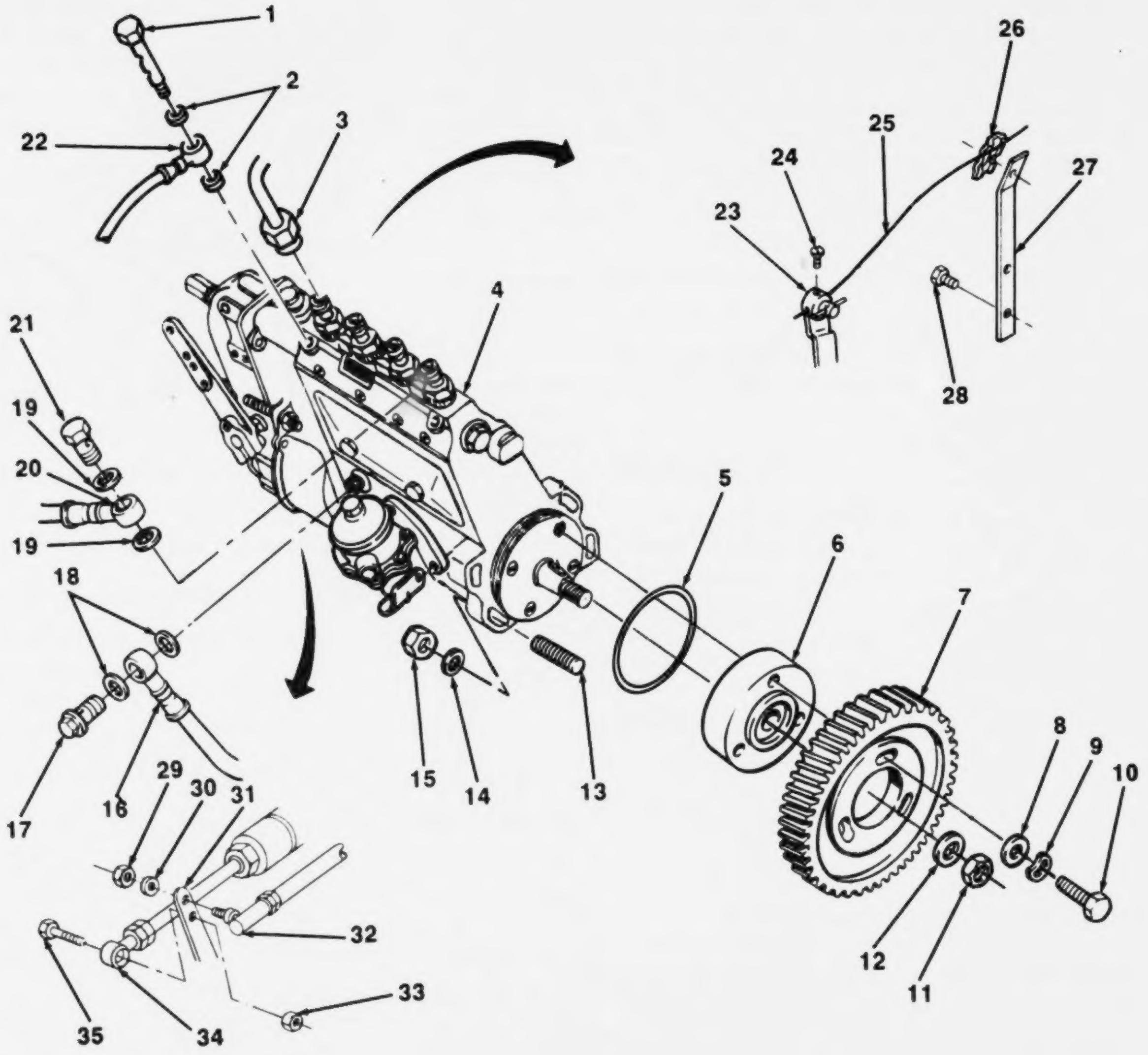
a. REMOVAL

1. Remove screw (35), self-locking nut (33), and air cylinder assembly rod end (34) from throttle control lever (31). Discard self-locking nut.
2. Remove nut (29), lockwasher (30), and spring rod ball joint (32) from throttle control lever (31). Discard lockwasher.
3. Remove 2 capscrews (28) and engine stop cable bracket (27) and clamp (26) from engine block.
4. Loosen screw (24) and remove engine stop cable (25) from pin (23).
5. Remove fluid passage bolt (17), 2 washers (18), and oil line (16) from fuel injection pump (4).
6. Remove fuel injector lines (3) from fuel injection pump (4).
7. Remove fluid passage bolts (1 and 21) and 4 washers (2 and 19) from fuel lines (20 and 22) and fuel injection pump (4).
8. Set No. 1 piston at top dead center (see paragraph 5-4).
9. Remove 3 bolts (10), lockwashers (9), and washers (8) from injection pump drive gear (7). Discard lockwashers.
10. Remove 4 nuts (15), washers (14), fuel injection pump (4), and preformed packing (5). Discard preformed packing.
11. Remove nut (11), washer (12), and hub (6) from fuel injection pump (4).

b. INSTALLATION

1. Install hub (6) on fuel injection pump (4) with washer (12) and nut (11).
2. Aline slotted holes of fuel injection pump (4) with engine center studs (13), and install fuel injection pump and new preformed packing (5) with 4 nuts (15) and washers (14).
3. Position injection pump drive gear (7) in place on fuel injection pump (4) and install 3 bolts (10), new lockwashers (9), and washers (8).

5-20. FUEL INJECTION PUMP REPLACEMENT (Con't).



4. Install fuel lines (20 and 22) on fuel injection pump (4) with fluid passage bolts (1 and 21) and 4 washers (2 and 19).
5. Position 4 fuel injector lines (3) in place on fuel injection pump (4) and tighten fittings.
6. Position oil line (16) in place on fuel injection pump (4) and install fluid passage bolt (17) and 2 washers (18).
7. Install engine stop cable (25) in pin (23) and tighten screw (24).
8. Position engine stop cable bracket (27) and clamp (26) in place on engine block and install 2 capscrews (28).

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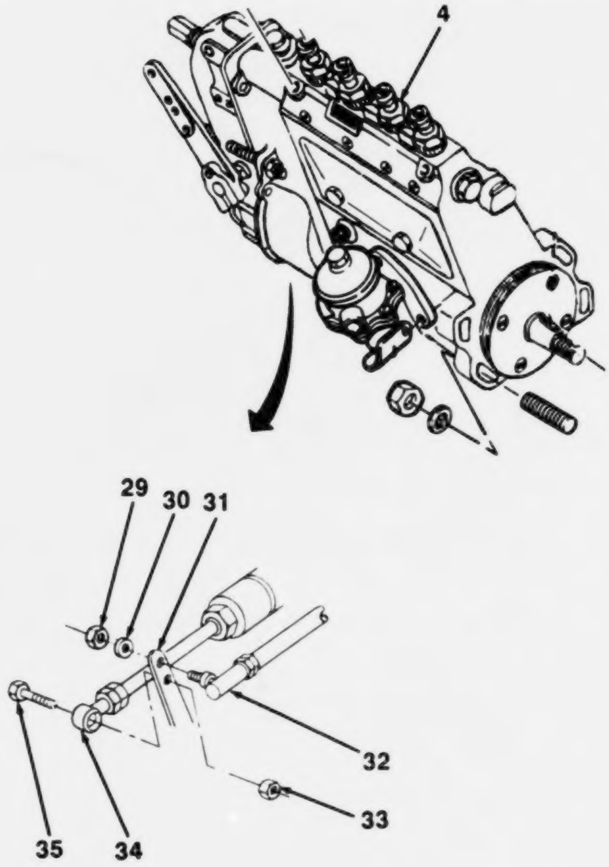
5-20. FUEL INJECTION PUMP REPLACEMENT (Con't).

9. Position spring rod ball joint (32) in place on throttle control lever (31), and install nut (29) and new lockwasher (30).

10. Position air cylinder assembly rod end (34) in place on throttle control lever (31), and install screw (35) and new self-locking nut (33).



FOLLOW-ON TASKS:

- Install idler pulley assembly (see paragraph 4-35).
- Install solenoid valve (see paragraph 4-59).
- Install metering fuel pump (see paragraph 4-22).
- Connect battery cables (see paragraph 4-57).

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Section IV. ELECTRICAL SYSTEM MAINTENANCE

Paragraph Number	Title	Page Number
5-21	Alternator Repair	5-47
5-22	Starter Motor Repair	5-50

5-21. ALTERNATOR REPAIR.

This Task Covers:

a. Disassembly

b. Assembly

Initial Setup:

Equipment Conditions:

- Alternator removed (see paragraph 4-36).
- Voltage regulator removed (see paragraph 4-38).

Tools/Test Equipment:

- General mechanic's tool kit
- Arbor press
- Bearing puller

Materials/Parts:

- One preformed packing
- One retaining ring
- One spacer
- Two lockwashers
- Two self-locking nuts

5-21. ALTERNATOR REPAIR (Con't).

a. DISASSEMBLY

1. Remove 2 screws (22), cover (21), and electric brush holder assembly (17).

2. Remove 4 screws (25) from rear housing (16) and front housing (5).

CAUTION

When separating housings, do not insert screwdrivers deeper than 0.063 in. (1.6 mm). Damage to the stator windings may result.

3. Separate rear housing (16) from front housing (5).

4. Place rear housing (16), open end down, on clean work surface.

5. Remove 2 self-locking nuts (24), 2 flatwashers (26), and insulators (27). Discard self-locking nuts.

6. Remove nut (23), lockwasher (20), flatwasher (19), and insulator (18). Discard lockwasher.

7. Remove stator (11) and 2 semiconductor devices (12 and 13) from rear housing (16).

8. Remove 2 sleeves (32) and semiconductor device (33).

9. Remove spacer (28) and insulator (14).

NOTE

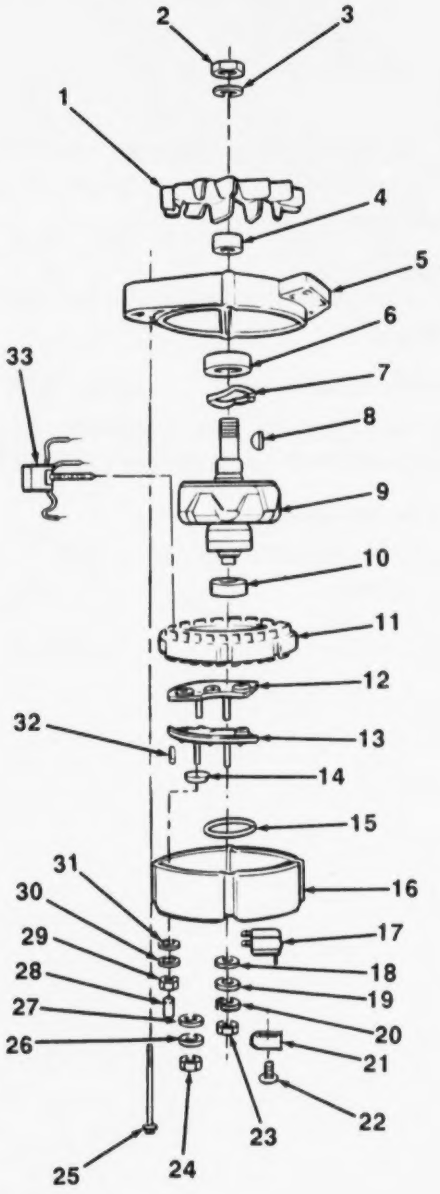
Tag and mark location of stator electrical leads prior to removal.

10. Disconnect stator (11) electrical leads from semiconductor devices (12 and 13).

11. Remove nut (29), washer (30), and insulator (31). Remove semiconductor device (33).

12. Remove preformed packing (15) from rear housing (16). Discard preformed packing.

13. Using puller, remove bearing (10) from rotor assembly (9).



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5-21. ALTERNATOR REPAIR (Con't).

14. Remove nut (2), lockwasher (3), fan impeller (1), key (8), and spacer (4) from rotor assembly (9). Discard lockwasher and spacer.

15. Drive rotor assembly (9) out of front housing (5).

16. Remove retaining ring (7) from front housing (5). Discard retaining ring.

17. Using bearing puller, remove bearing (6) from front housing (5).

b. ASSEMBLY

NOTE

When installing bearing into front housing, use a driver that contacts ONLY the outer race of the bearing.

1. Using arbor press, install bearing (6) into front housing (5).

2. Install new retaining ring (7) in recess of front housing (5) so tabs aline with opening of housing.

NOTE

When installing front housing into rotor assembly, use a driver that contacts ONLY the inner race of the bearing.

3. Using arbor press, install front housing (5) onto rotor assembly (9).

4. Install new spacer (4), key (8), fan impeller (1), new lockwasher (3), and nut (2) on rotor assembly (9).

5. Using arbor press, install bearing (10) on rotor assembly (9).

6. Install new preformed packing (15) in rear housing (16).

7. Install semiconductor device (33) with nut (29), washer (30), and insulator (31).

8. Connect stator (11) electrical leads to semiconductor devices (12 and 13).

9. Install spacer (28) and insulator (14) on terminal.

10. Install 2 sleeves (32) and semiconductor device (33) on terminals.

11. Install stator (9) and 2 semiconductor devices (12 and 13) in rear housing (16).

12. Install nut (23), new lockwasher (20), flatwasher (19), and insulator (18) on terminal.

13. Install 2 new self-locking nuts (24), 2 flatwashers (26), and insulators (27) on terminals.

14. Position front housing (5) on rear housing (16) and aline screw holes.

15. Install 4 screws (25) in rear housing (16) and front housing (5).

16. Position electric brush assembly (17) in place and install cover (21) and 2 screws (22).

FOLLOW-ON TASKS:

- Install voltage regulator (see paragraph 4-38).
- Install alternator (see paragraph 4-36).

5-22. STARTER MOTOR REPAIR.

This Task Covers:

a. Disassembly	b. Assembly

Initial Setup:

Equipment Conditions:

- Starter motor removed (see paragraph 4-39).

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- One preformed packing

a. DISASSEMBLY

NOTE

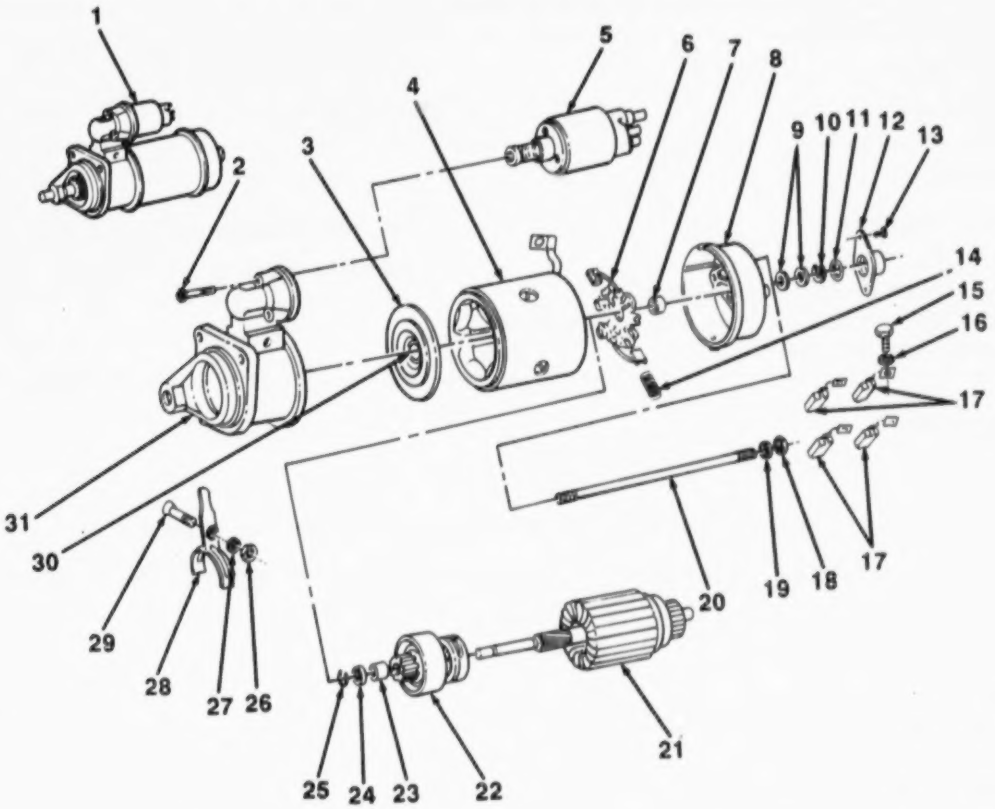
Perform step 1 only if solenoid was not removed when starter was removed. If solenoid was removed, go to step 2.

1. Unscrew 3 screws (2) and remove solenoid (5) from starter (1).
2. Remove 2 capscrews (13), capsule (12), preformed packing (11), circlip (10), and spacers (9). Discard preformed packing.
3. Remove 2 nuts (18) and washers (19) from studs (20). Remove end plate (8).
4. Remove retainer (6), 4 springs (14), screws (15), washers (16), brushes (17), and sleeve bushing (7).
5. Slide winding (4) off armature (21) and remove studs (20).
6. Remove screw (29), spring washer (27), and nut (26).
7. Slide end housing (31) off drive assembly and pinion (22).
8. Remove shifter fork (28), circlip (25), sleeve bushing (23), and retainer (24) from armature (21).
9. Remove drive assembly and pinion (22) from armature (21).
10. Remove end plate (3), then remove sleeve bushing (30) from end plate.

b. ASSEMBLY

1. Install sleeve bushing (30) in end plate (3). Install end plate on armature (21).
2. Install drive assembly and pinion (22) on armature (21).
3. Install sleeve bushing (23), retainer (24), and circlip (25) on armature (21).
4. Slide shifter fork (28) on drive assembly and pinion (22). Slide end housing (31) onto armature (21).
5. Install screw (29), spring washer (27), and nut (26).

5-22. STARTER MOTOR REPAIR (Con't).



6. Install studs (20) in end housing (31). Slide winding (4) onto armature (21).

7. Install brushes (17) on retainer (6) with screws (15) and washers (16).

8. Install retainer (6), 4 springs (14), and sleeve bushing (7).

9. Position end plate (8) in place and install 2 washers (19) and nuts (18) on studs (20).

10. Position capsule (12), new preformed packing (11), circlip (10), and spacers (9) in place and install 2 capscrews (13).

11. Position solenoid (5) in place on end housing (31). Install 3 screws (2).

FOLLOW-ON TASKS:

- Install starter motor (see paragraph 4-39).

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Section V. AXLE ASSEMBLY MAINTENANCE

5-23. FRONT AND REAR AXLE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Trailer parked on flat, level surface.
- Trailer tires removed on both ends of axle to be removed (see paragraph 4-73).

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

NOTE

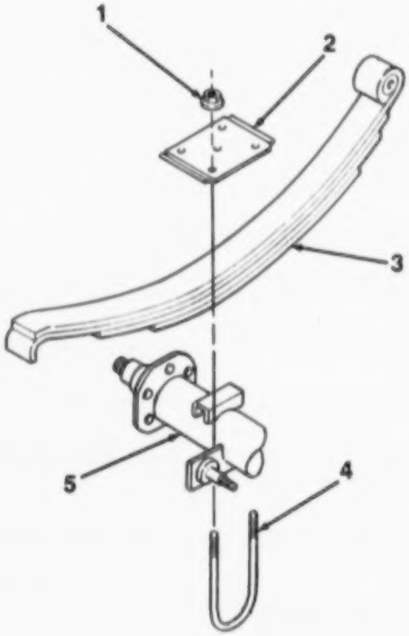
Use this task to replace either the front or rear axle assembly.

1. Remove hoses, lines, and fittings from axle assembly (5) to be replaced (see paragraph 4-72).
2. Remove brakedrums from axle to be replaced (see paragraph 4-66).
3. Remove brakeshoes and wheel cylinders from axle to be replaced (see paragraph 4-67).
4. Remove shock absorbers from axle to be replaced (see paragraph 4-78).

WARNING

Axle is very heavy and can cause serious injury. To prevent injury, place suitable supports under axle before removing nuts and U-bolts.

5. Support axle with suitable support. Remove 8 nuts (1), 4 U-bolts (4), and 2 tie plates (2) and remove axle assembly (5) from leaf spring (3).



b. INSTALLATION

1. Position axle assembly (5) in place on leaf spring (3).
2. Install 4 U-bolts (4), 8 nuts (1), and 2 tie plates (2) on axle assembly (5) and leaf spring (3). Tighten nuts to 75 lb.-ft. (102 N•m).
3. Install shock absorbers (see paragraph 4-78).

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5-23. FRONT AND REAR AXLE REPLACEMENT (Con't).

4. Install brakeshoes and wheel cylinders (see paragraph 4-67).
5. Install brakedrums (see paragraph 4-66).
6. Install hoses, lines, and fittings (see paragraph 4-72).

FOLLOW-ON TASKS:

- Install trailer tires (see paragraph 4-73).

Section VI. FRAME AND TOWING ASSEMBLY MAINTENANCE

5-24. FRAME ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal b. Installation

Initial Setup:

Equipment Conditions:

- Tool boxes removed (see paragraph 4-79).
- Hose reel support bracket removed (see paragraph 4-103).
- Engine removed (see paragraph 5-5).
- Rear end panel assembly removed (see paragraph 5-29).
- Air compressor housing removed (see paragraph 5-32).

Materials/Parts:

- Twenty-four lockwashers

Tools/Test Equipment:

- General mechanic's tool kit

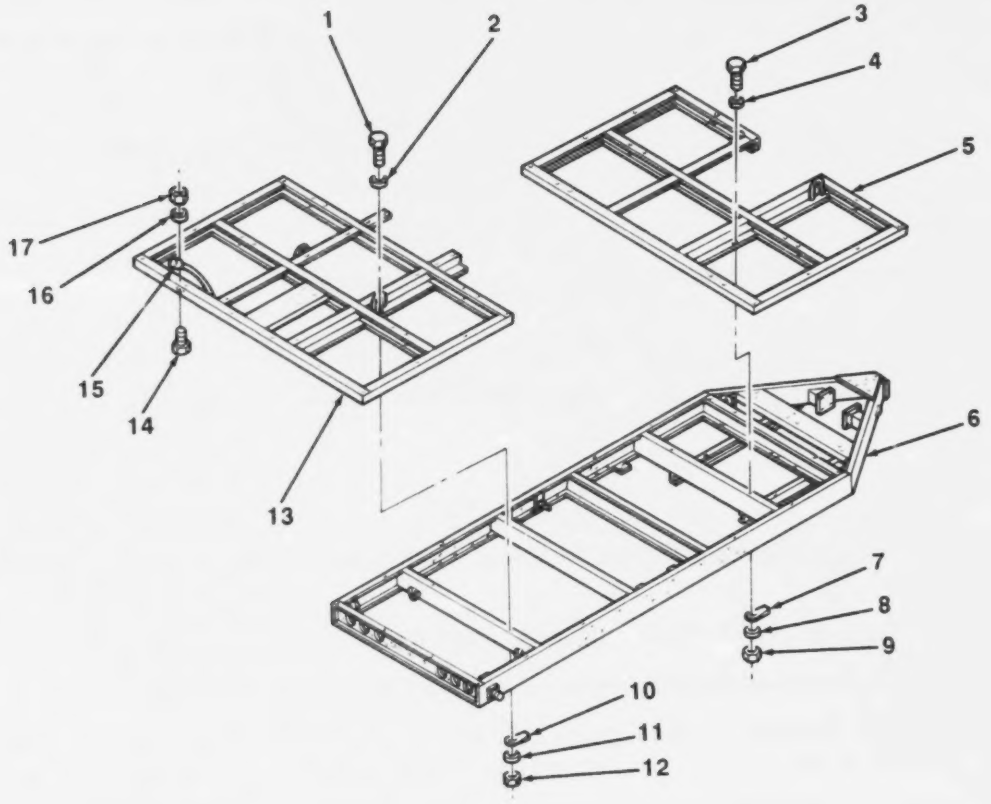
a. REMOVAL

1. Remove 4 screws (14), lockwashers (16), nuts (17), and loop clamps (15) from rear frame section (13). Discard lockwashers.
2. Remove 10 capscrews (1), bevel washers (10), lockwashers (11), nuts (12), 2 flatwashers (2), and rear frame section (13) from frame (6). Discard lockwashers.
3. Remove 10 capscrews (3), bevel washers (7), lockwashers (8), nuts (9), 2 flatwashers (4), and front frame section (5) from frame (6). Discard lockwashers.

b. INSTALLATION

1. Position front frame section (5) in place on frame (6) and install 10 capscrews (3), bevel washers (7), new lockwashers (8), 2 flatwashers (4), and nuts (9).
2. Position rear frame section (13) in place on frame (6) and install 10 capscrews (1), bevel washers (10), new lockwashers (11), 2 flatwashers (2), and nuts (12).
3. Position electrical wiring harnesses and 4 loop clamps (15) in place on rear frame section (13), and install 4 screws (14), new lockwashers (16), and nuts (17).

5-24. FRAME ASSEMBLY REPLACEMENT (Con't).



FOLLOW-ON TASKS:

- Install air compressor housing (see paragraph 5-32).
- Install rear end panel assembly (see paragraph 5-29).
- Install engine (see paragraph 5-5).
- Install hose reel support bracket (see paragraph 4-103).
- Install tool boxes (see paragraph 4-79).

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Section VII. SUSPENSION MAINTENANCE

5-25. LEAF SPRINGS AND HANGERS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Axle assembly removed (see paragraph 5-23).

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- One cotter pin
- Two self-locking nuts

a. REMOVAL

NOTE

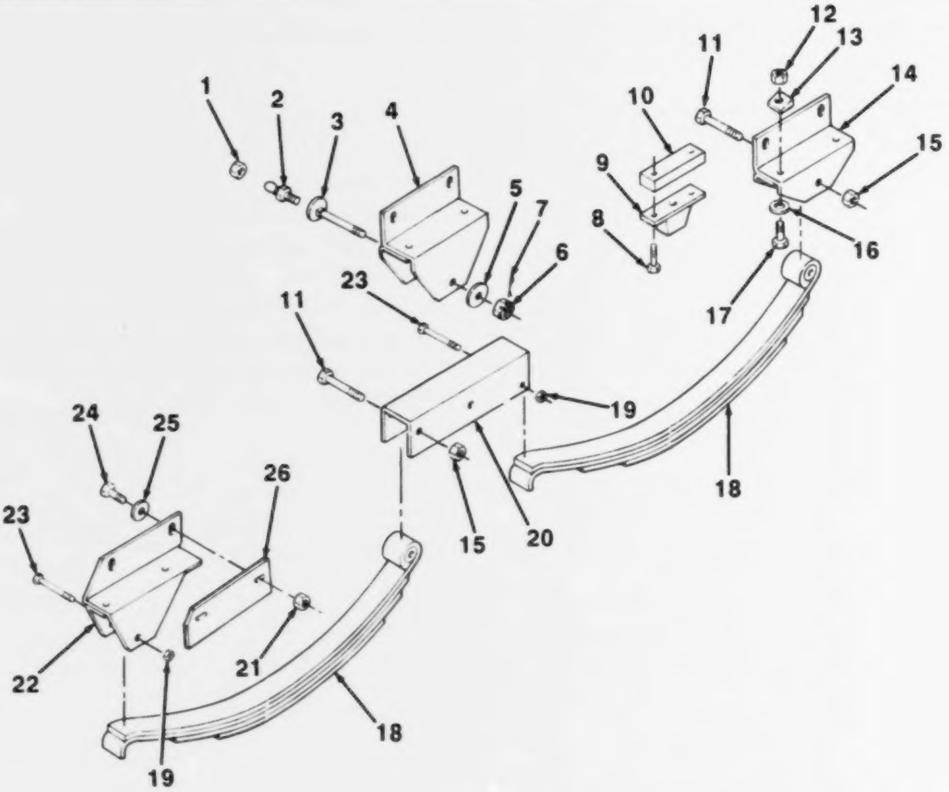
- **Use this task to replace either the left or right leaf springs and hanger. Left side is shown.**
- **Front hangers are not interchangeable, others are.**
- **For ease of removal, begin by removing screw holding looped end of leaf spring.**

1. Remove 2 screws (23) and self-locking nuts (19) from suspension equalizer (20) and hanger (22). Discard self-locking nuts.
2. Remove 2 bolts (11) and nuts (15) from leaf springs (18), suspension equalizer (20), and hanger (22).
3. Remove leaf springs (18).
4. Remove cotter pin (7), castle nut (6), washer (5), capscrew (3), and suspension equalizer (20) from hanger (2). Discard cotter pin.
5. Remove grease fitting (2) and fitting cover (1) from capscrew (3).
6. Remove 6 capscrews (24), washers (25), nuts (21), and 3 bevel washers (13) from hangers (4, 14, and 22).
7. Remove 6 capscrews (17), washers (16), bevel washers (13), and nuts (12) from hangers (4, 14, and 22). Remove hangers and 3 spacers (26) from frame.
8. Remove 4 screws (8), 2 axle bumper pads (9), and spacers (10) from frame.

b. INSTALLATION

1. Install 2 axle bumper pads (9) and spacers (10) on frame with 4 screws (8).
2. Position hangers (4, 14, and 22) and 3 spacers (26) on frame. Install 6 capscrews (24), washers (25), and nuts (21).

5-25. LEAF SPRINGS AND HANGERS REPLACEMENT (Con't).



3. Install 6 capscrews (17), washers (16), bevel washers (13), and nuts (12).
4. Install fitting cover (1) and grease fitting (2) in capscrew (3).
5. Position suspension equalizer (20) in place in hanger (4) and install capscrew (3), washer (5), castle nut (6), and new cotter pin (7).
6. Position leaf springs (18) in place in hangers (14 and 22) and suspension equalizer (20).
7. Install 2 bolts (11) and nuts (15) through hanger (14), suspension equalizer (20), and leaf springs (18).
8. Install 2 screws (23) and new self-locking nuts (19), under looped end of leaf springs (18), in suspension equalizer (20) and hanger (22).

FOLLOW-ON TASKS:

- Install axle assembly (see paragraph 5-23).

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Section VIII. BODY MAINTENANCE

Paragraph Number	Title	Page Number
5-26	Fender Replacement	5-59
5-27	Baffles and Oil Cooler Supports Replacement	5-61
5-28	Door Assemblies and Access Door Replacement	5-64
5-29	Rear End Panel Assembly Replacement	5-68
5-30	Right Front Panel Replacement	5-70
5-31	Roof Assembly Replacement	5-72
5-32	Air Compressor Housing Replacement	5-74
5-33	Fiberglass Panels Replacement	5-76
5-34	Roof Side Support and Doorstops Replacements	5-80

5-26. FENDER REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.

Tools/Test Equipment:

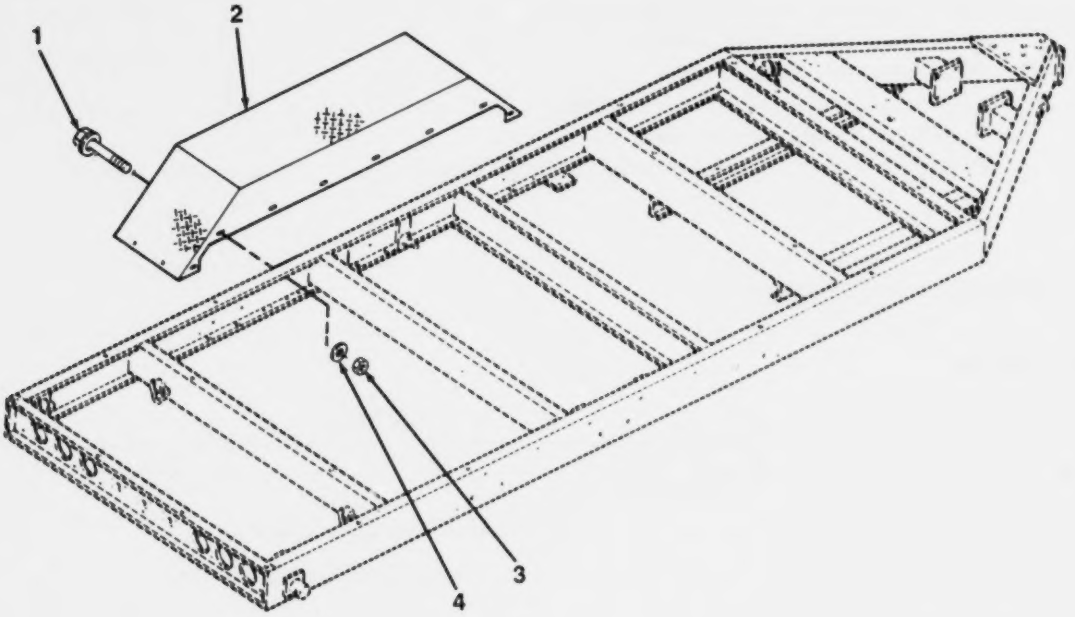
- General mechanic's tool kit

Personnel Required: Two

5-26. FENDER REPLACEMENT (Con't).

a. REMOVAL

1. Remove 8 capscrews (1), washers (4), and nuts (3) from fender (2).
2. Remove fender (2) from frame.



b. INSTALLATION

1. Position fender (2) in place on frame.
2. Install 8 capscrews (1), washers (4), and nuts (3) in fender (2).

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5-27. BAFFLES AND OIL COOLER SUPPORTS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Left and right door assemblies open.
- Battery cables disconnected (see paragraph 4-57).
- System air pressure relieved.

Tools/Test Equipment:

- General mechanic's tool kit

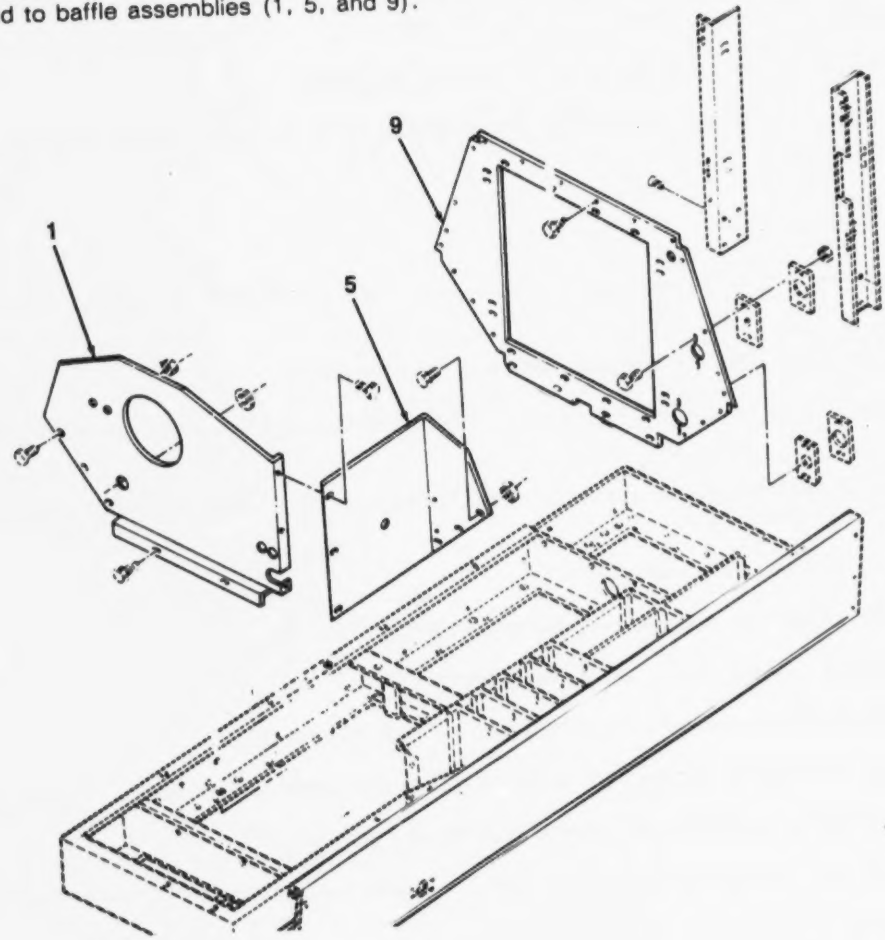
Materials/Parts:

- Two gaskets
- Ten self-locking nuts
- Ten self-locking screws

Personnel Required: Two

a. REMOVAL

1. Disconnect and remove all cables, electrical wiring harnesses, lines, and hoses that pass through, or are attached to baffle assemblies (1, 5, and 9).



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5-27. BAFFLE AND OIL COOLER SUPPORTS REPLACEMENT (Con't).

2. Remove air intake connector (see paragraph 4-33).
3. Remove fuel/water separator (see paragraph 4-27).
4. Remove 3 self-locking screws (6) and nuts (7) from side baffle assembly (5) and storage box (18). Discard self-locking screws and nuts.
5. Remove 3 screws (4) and side baffle assembly (5) from rear baffle assembly (1).
6. Remove 2 screws (19) from front baffle assembly (1). Remove 3 self-locking screws (20) and nuts (2). Remove front baffle assembly (1) from trailer. Discard self-locking screws and nuts.
7. Remove electrical bushing (3) from rear baffle assembly (1).
8. Remove oil filter base and bracket (see paragraph 4-85).
9. Remove oil cooler (see paragraph 4-17).
10. Disconnect and remove all cables, electrical wiring harnesses, lines, and hoses that pass through, or are attached to front wall baffle (9).
11. Remove 4 self-locking screws (8), nuts (14), 2 covers (15), and gaskets (16 and 17) from front wall baffle (9). Discard gaskets, self-locking screws, and nuts.
12. Remove 22 screws (10) and front wall baffle (9) from trailer.
13. Remove 4 screws (11) from left and right oil cooler supports (12 and 13). Remove left and right oil cooler supports from trailer.

b. INSTALLATION

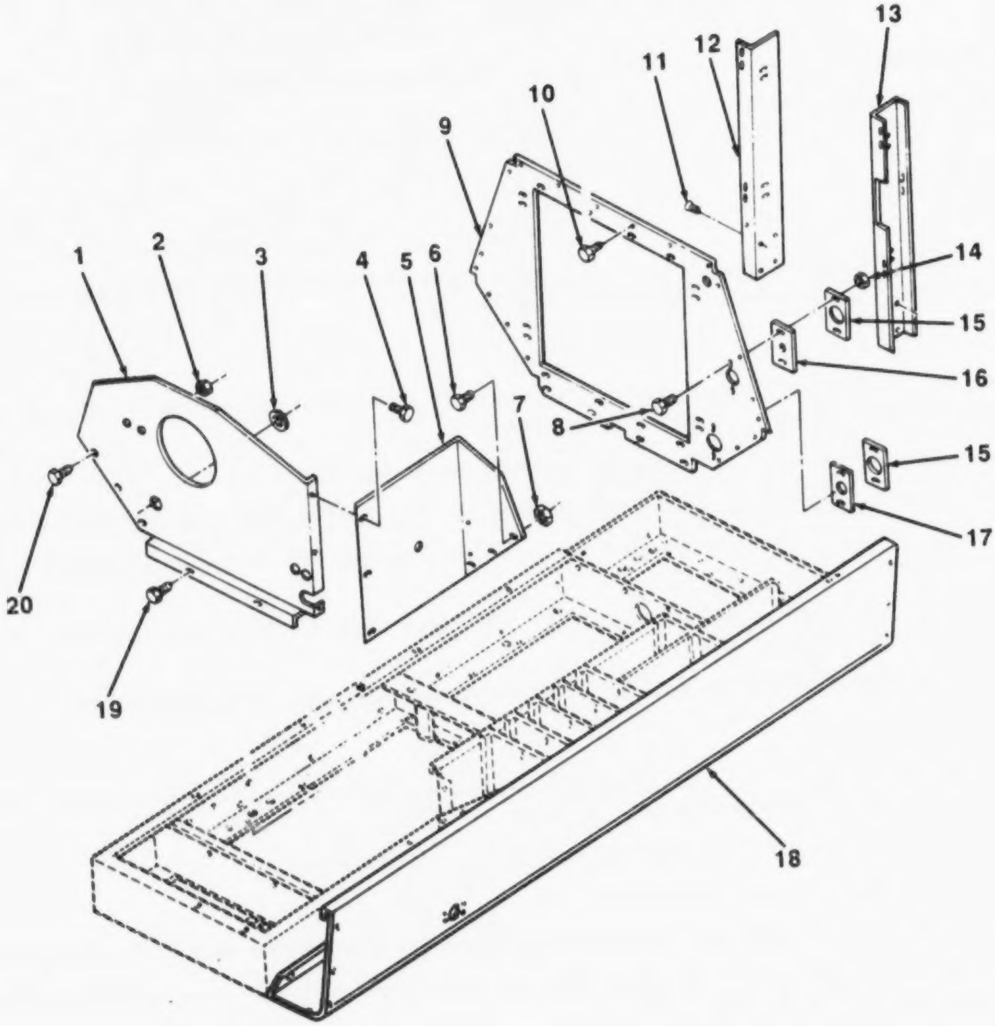
1. Position left and right oil cooler supports (12 and 13) in place and install 4 screws (11) in left and right oil cooler supports.
2. Position front wall baffle (9) in place and install 22 screws (10).
3. Install 2 new gaskets (16 and 17), covers (15), 4 new self-locking screws (8), and nuts (14) on front wall baffle (9).
4. Install and connect all cables, electrical wiring harnesses, lines, and hoses that pass through or are attached to front wall baffle (9).
5. Install oil cooler (see paragraph 4-17).
6. Install oil filter base and bracket (see paragraph 4-85).
7. Install electrical bushing (3) in rear baffle assembly (1).
8. Position front baffle assembly (1) in place and install 2 screws (19).
9. Install 3 new self-locking screws (20) and nuts (2) in rear baffle assembly (1).
10. Position side baffle assembly (5) in place and install 3 screws (4).
11. Install 3 new self-locking screws (6) and nuts (7) in side baffle assembly (5) and storage box (18).

5-27. BAFFLE AND OIL COOLER SUPPORTS REPLACEMENT (Con't).

12. Install fuel/water separator (see paragraph 4-27).

13. Install air intake connector (see paragraph 4-33).

14. Install and connect all cables, electrical wiring harnesses, lines, and hoses that pass through, or are attached to baffle assemblies (1, 5, and 9).



FOLLOW-ON TASKS:

- Connect battery cables (see paragraph 4-57).
- Close left and right door assemblies.

TA505594

5-28. DOOR ASSEMBLIES AND ACCESS DOOR REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Door assembly or access door to be removed open.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- Six lockwashers
- Thirteen self-locking nuts
- Thirteen self-locking screws

Personnel Required: Two

a. REMOVAL

NOTE

Use this task to remove either the left or right door assembly, or the access door. Right door assembly and access door shown.

DOOR ASSEMBLY

1. Remove 2 nuts (6) and lockwashers (5) from doorstop ends of door closures (4). Do not remove door closures from doorstop. Discard lockwashers.
2. Remove 11 screws (1) from hinge (2) and door assembly (3).
3. Remove door closures (4) from door assembly (3) and remove door assembly from trailer.
4. Remove 2 nuts (14), lockwashers (13) and door closures (4) from door assembly (3). Discard lockwashers.
5. Remove 10 self-locking screws (20), nuts (18), and hinge (2) from roof assembly (17). Discard self-locking screws and nuts.
6. Inspect fiberglass panels (7, 8, and 19) and replace if necessary (see paragraph 5-33).

ACCESS DOOR

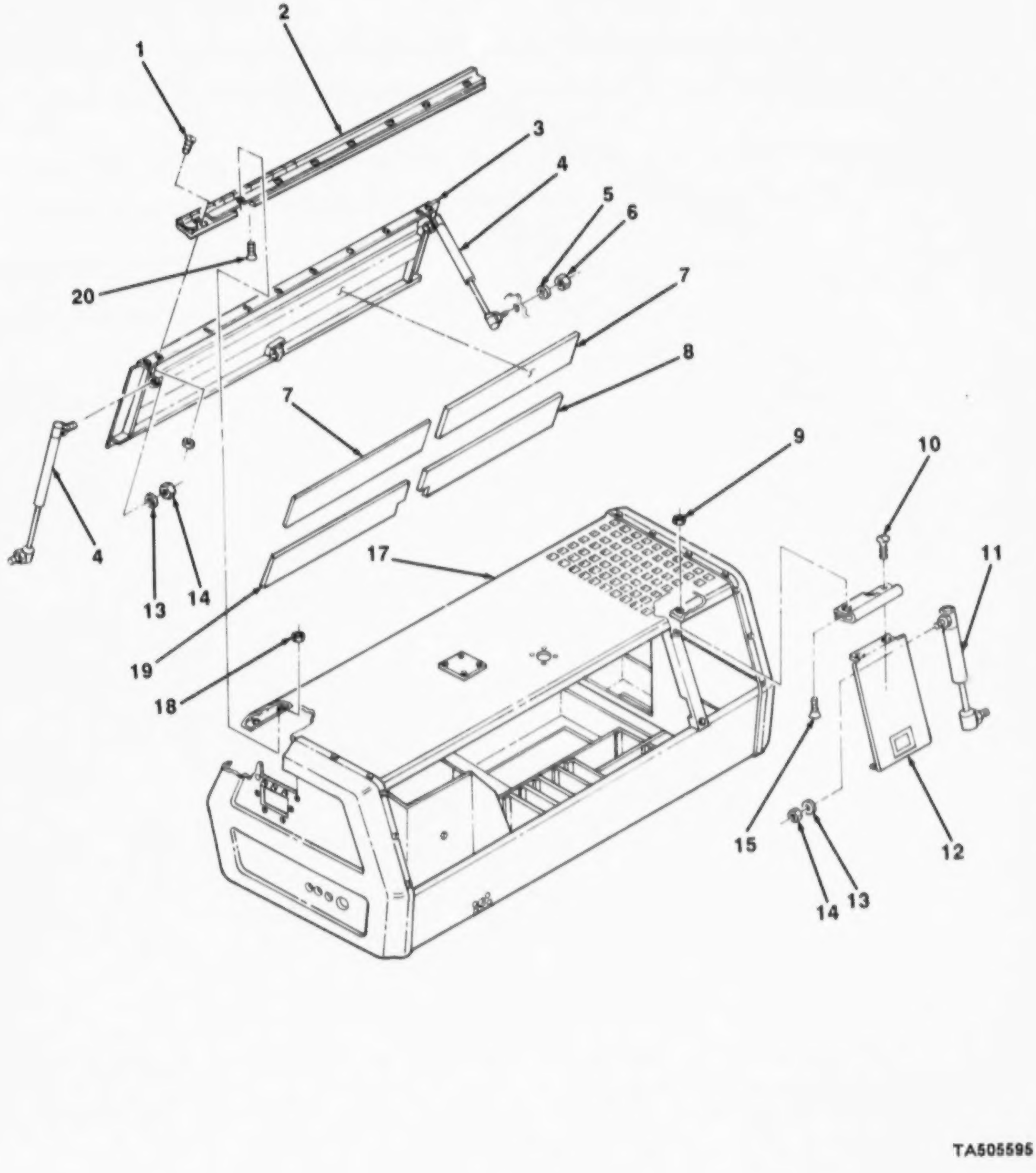
1. Remove nut (6) and lockwasher (5) from doorstop end of door closure (4). Do not remove door closure from doorstop. Discard lockwasher.
2. Remove 4 screws (11) from hinge (10) and access door (12).
3. Remove access door (12) from trailer.
4. Remove nut (14), lockwasher (13), and door closure (4) from access door (12). Discard lockwasher.
5. Remove 3 self-locking screws (15), nuts (9), and hinge (10) from roof assembly (17). Discard self-locking screws and nuts.

b. INSTALLATION

ACCESS DOOR

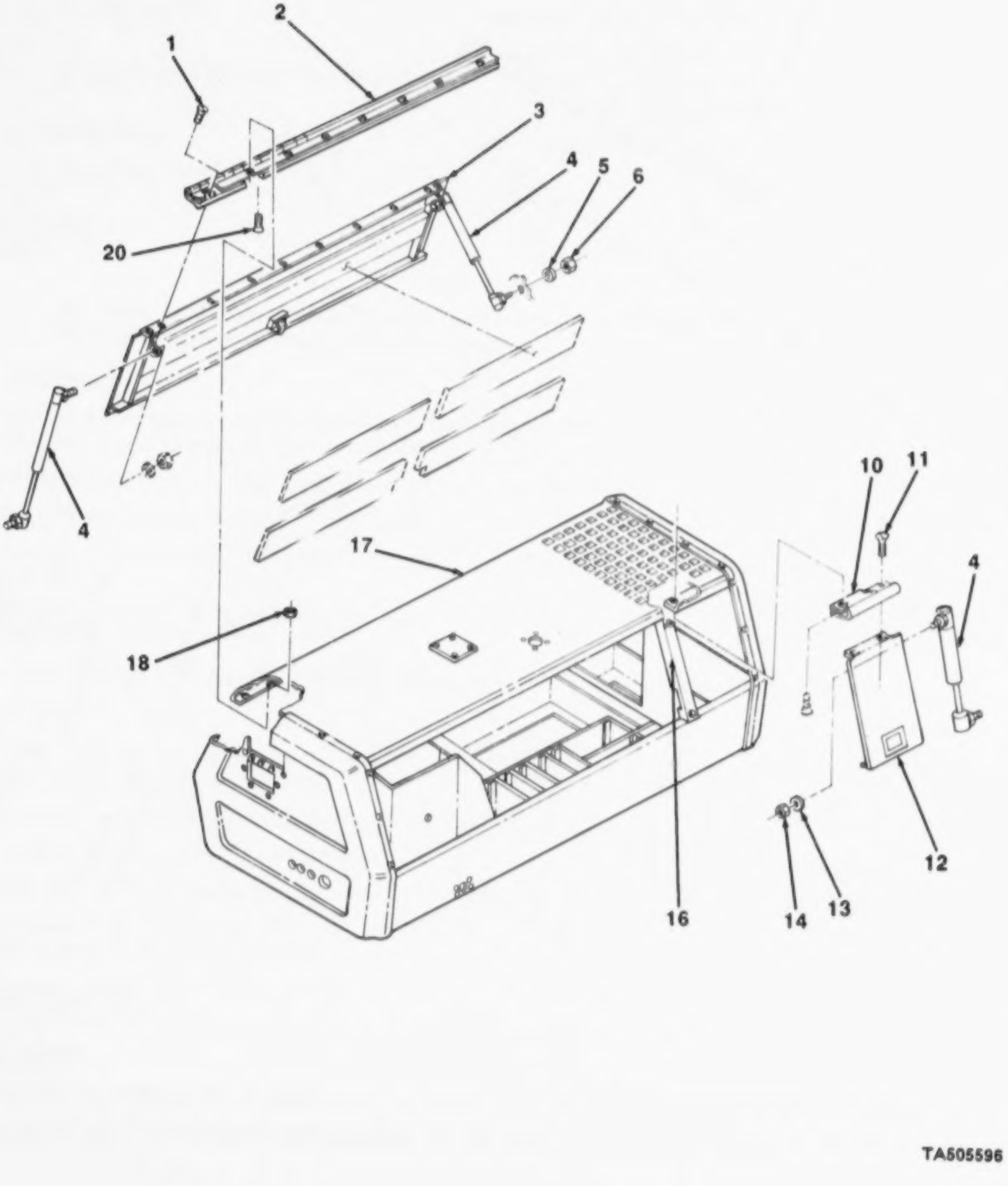
1. Position door closure (4) in place on access door (12) and install nut (14) and new lockwasher (13).
2. Position hinge (10) in place on roof assembly (17) and install 3 new self-locking screws (15) and nuts (9).

5-28. DOOR ASSEMBLIES AND ACCESS DOOR REPLACEMENT (Con't).



TA505595

5-28. DOOR ASSEMBLIES AND ACCESS DOOR REPLACEMENT (Con't).



TA505596

5-28. DOOR ASSEMBLIES AND ACCESS DOOR REPLACEMENT (Con't).

3. Install door closure (4) on side support (16) with nut (6) and new lockwasher (5).
4. Position and hold access door (12) in place and install 4 screws (11) in hinge (10) and access door (12).

DOOR ASSEMBLY

1. Position door closures (4) in place and install 2 nuts (14) and new lockwashers (13).
2. Position hinge (2) in place on roof assembly (17) and install 10 new self-locking screws (20) and nuts (18).
3. Install door closures (4) on door assembly (3) with 2 nuts (6) and new lockwashers (5).
4. Position and hold door assembly (3) in place and install 11 screws (1) in hinge (2).

FOLLOW-ON TASKS:

- Close door assembly or access door.

5-29. REAR END PANEL ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal
b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Engine starting aid removed (see paragraph 4-28).
- Control panel removed (see paragraph 4-49).
- Indicator panel removed (see paragraph 4-55).
- Air discharge hose assembly removed (see paragraph 4-99).
- Control panel light removed (see paragraph 4-49).
- Left and right door assemblies closed.
- Elbow and adapter from service air manifold removed (see paragraph 4-100).
- Battery cables disconnected (see paragraph 4-57).

Materials/Parts:

- Two lockwashers
- Seventeen rivets

Tools/Test Equipment:

- General mechanic's tool kit
- Electric, drill
- Twist drill bit, $\frac{3}{16}$ in.

Personnel Required: Two

a. REMOVAL

1. Remove 21 screws (1) from rear end panel assembly (2). Remove rear end panel assembly from trailer.

NOTE

If rear end panel assembly is damaged and must be replaced, perform step 2. If not, go to step 6.

2. Remove 2 screws (11), lockwashers (13), nuts (14), and magnetic catch (12) from rear end panel assembly (2). Discard lockwashers.
3. Using drill and twist drill bit, remove 3 rivets (10) from control panel hinge (8) and rear end panel assembly (2). Discard rivets.
4. Remove control panel cover (9) and hinge (8).
5. Using drill and twist drill bit, remove 14 rivets (7) and 3 plates (4, 5, and 6) from rear end panel assembly (2). Discard rivets.
6. Inspect fiberglass panel (3) and replace if necessary (see paragraph 5-33).

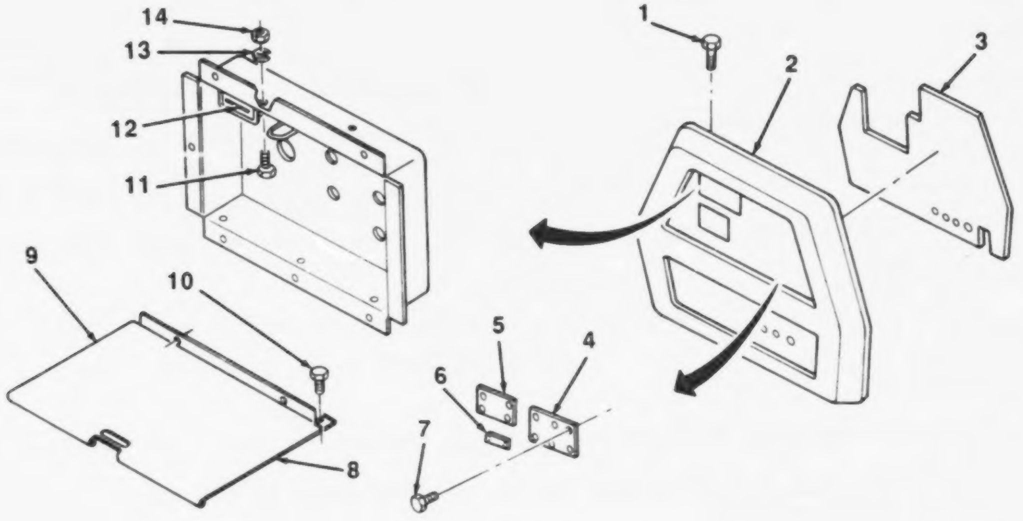
b. INSTALLATION

NOTE

If rear end panel assembly is new, begin with step 1. If not, go to step 4.

1. Position plates (4, 5, and 6) in place on rear end panel assembly (2) and install 14 new rivets (7).
2. Position control panel cover (9) and hinge (8) in place and install 3 new rivets (10).

5-29. REAR END PANEL ASSEMBLY REPLACEMENT (Con't).



3. Position magnetic catch (12) in place and install 2 screws (11), new lockwashers (13), and nuts (14).
4. Position rear end panel assembly (2) in place on trailer and install 21 screws (1).

FOLLOW-ON TASKS:

- Open left and right door assemblies.
- Install elbow and adapter from service air manifold (see paragraph 4-100).
- Install air discharge hose assembly (see paragraph 4-99).
- Install control panel light (see paragraph 4-49).
- Install indicator panel assembly (see paragraph 4-55).
- Install control panel (see paragraph 4-49).
- Install engine starting aid (see paragraph 4-28).
- Connect battery cables (see paragraph 4-57).
- Close left and right door assemblies.

TA505597

5-30. RIGHT FRONT PANEL REPLACEMENT.

This Task Covers:

a. Removal
b. Installation

Initial Setup:

Equipment Conditions:

- Front end panel assembly removed (see paragraph 4-82).

Tools/Test Equipment:

- General mechanic's tool kit
- Electric drill
- Twist drill bit, 3/16 in.

Materials/Parts:

- Three self-locking nuts
- Three self-locking screws
- Eight self tapping screws

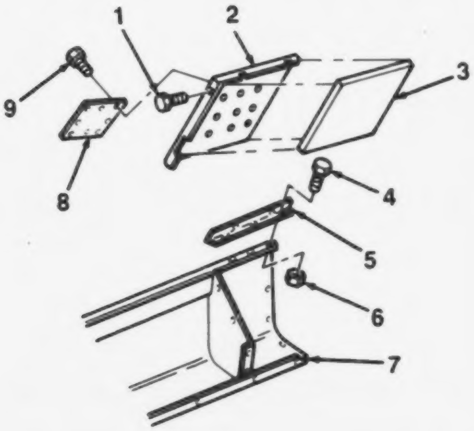
a. REMOVAL

1. Remove seven screws (1) from right front panel (2). Remove right front panel from trailer.
2. Remove 3 self-locking screws (4) and nuts (6) from filler angle (5) and storage box (7). Discard self-locking screws and nuts.

NOTE

If right front panel is damaged and must be replaced, perform step 3. If not, go to step 4.

3. Using electric drill and twist drill bit, remove 8 self tapping screws (9) and plate (8) from right front panel (2). Discard rivets.
4. Inspect fiberglass panel (3) and replace if necessary (see paragraph 5-33).



TA505598

5-30. RIGHT FRONT PANEL REPLACEMENT (Con't).

b. INSTALLATION

NOTE

If right front panel is new, perform step 1. If not, go to step 2.

1. Position plate (8) in place on right front panel (2) and install 8 new self tapping screws (9).
2. Position filler angle (5) in place on storage box (7) and install 3 new self-locking screws (4) and nuts (6).
3. Position right front panel (2) in place on trailer and install seven screws (1).

FOLLOW-ON TASKS:

- Install front end panel assembly (see paragraph 4-82).

5-31. ROOF ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.
- Protective cap assembly removed (see paragraph 4-30).
- Left and right door assemblies removed (see paragraph 5-28).
- Access door removed (see paragraph 5-28).
- Front end panel assembly removed (see paragraph 4-82).
- Right front panel removed (see paragraph 5-30).
- Roof side support and doorstops removed (see paragraph 5-34).

Tools/Test Equipment:

- General mechanic's tool kit

Personnel Required: Two

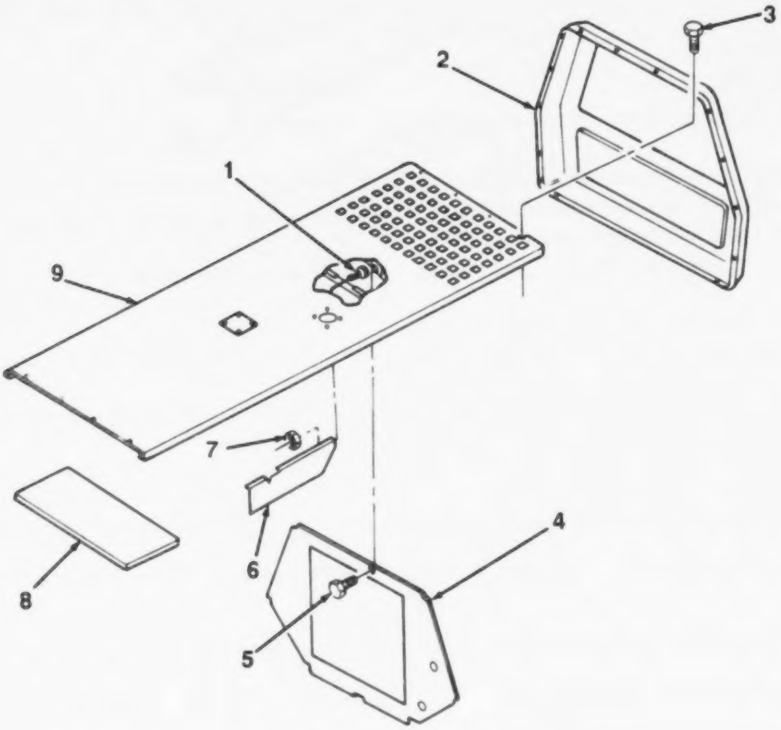
a. REMOVAL

1. Remove 6 screws (5) from rear wall baffle (4) and roof assembly (9).
2. Remove 4 screws (3) from roof assembly (9) and front end panel assembly (2).
3. Remove roof assembly (9) from trailer.
4. Remove 2 screws (1), nuts (7), and air deflector (6) from roof assembly (9).
5. Inspect fiberglass panel (8) and replace if necessary (see paragraph 5-33).

b. INSTALLATION

1. Position air deflector (6) in place on roof assembly (9) and install 2 screws (1) and nuts (7).
2. Position roof assembly (9) in place on trailer.
3. Install 4 screws (3) in front end panel assembly (2) and roof assembly (9).
4. Install 6 screws (5) in rear wall baffle (4) and roof assembly (9).

5-31. ROOF ASSEMBLY REPLACEMENT (Con't).



FOLLOW-ON TASKS:

- Install roof side support and doorstops (see paragraph 5-34).
- Install right rear panel (see paragraph 5-30).
- Install front end panel assembly (see paragraph 4-82).
- Install access door (see paragraph 5-28).
- Install left and right door assemblies (see paragraph 5-28).
- Install protective cap assembly (see paragraph 4-30).

TA505599

5-32. AIR COMPRESSOR HOUSING REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Battery cables disconnected (see paragraph 4-57).
- Fuel tank removed (see paragraph 4-23).
- Oil separator removed (see paragraph 4-88).
- Engine removed (see paragraph 5-5).
- Baffles and oil cooler removed (see paragraph 5-27).
- Slave receptacle removed (see paragraph 4-60).
- Roof side support and doorstops removed (see paragraph 5-34).

Materials/Parts:

- One grommet

Tools/Test Equipment:

- General mechanic's tool kit

Personnel Required: Two

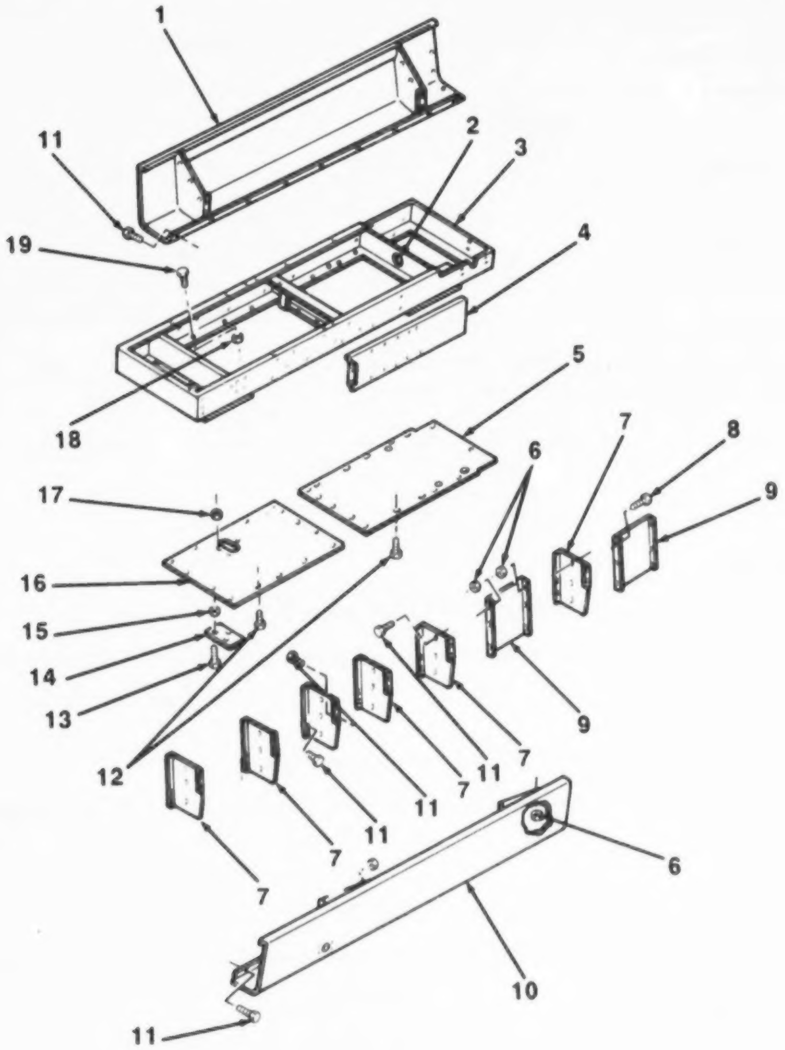
a. REMOVAL

1. Remove 12 screws (11) and accessories storage box (1) from air compressor housing (3).
2. Remove 44 screws (11), 6 screws (8), and nuts (6) from tool box (10), dividers (7 and 9), and engine shield (4).
3. Remove tool box (10), dividers (7 and 9), and engine shield (4) from air compressor housing (3).
4. Remove 18 screws (12) and rear belly pan (5) from air compressor housing (3).
5. Remove 14 screws (12) and front belly pan (16) from air compressor housing (3).
6. Remove 3 studs (13), retainers (15), spring nuts (17), and drain cover (14) from front belly pan (16).
7. Remove grommet (2) from air compressor housing (3). Discard grommet.
8. Remove 12 capscrews (19) and nuts (18) from air compressor housing (3) and frame. Remove air compressor housing.

b. INSTALLATION

1. Position air compressor housing (3) in place on frame and install 12 capscrews (19) and nuts (18).
2. Install new grommet (2) in air compressor housing (3).
3. Install drain cover (14) on front belly pan (16) with 3 studs (13), retainers (15), and spring nuts (17).
4. Install front belly pan (16) on air compressor housing (3) with 14 screws (12).
5. Install rear belly pan (5) on air compressor housing (3) with 18 screws (12).
6. Install accessories storage box (1) on air compressor housing (3) with 12 screws (11).
7. Install tool box (10), dividers (7 and 9), and engine shield (4) on air compressor housing (3) with 44 screws (11), 6 screws (8), and nuts (6).

5-32. AIR COMPRESSOR HOUSING REPLACEMENT (Con't).



FOLLOW-ON TASKS:

- Install roof side support and doorstops (see paragraph 5-34).
- Install slave receptacle (see paragraph 4-60).
- Install baffles and oil cooler supports (see paragraph 5-27).
- Install engine (see paragraph 5-5).
- Install oil separator (see paragraph 4-88).
- Install fuel tank (see paragraph 4-23).
- Connect battery cables (see paragraph 4-57).

TA505600

5-33. FIBERGLASS PANELS REPLACEMENT.

This Task Covers:

a. Removal
b. Cleaning
c. Installation

Initial Setup:

Equipment Conditions:

- Engine off.

Tools/Test Equipment:

- General mechanic's tool kit

General Safety Instructions:

- Dry cleaning solvent is flammable and must not be used near open flame. Use only in a well-ventilated area.

Materials/Parts:

- Adhesive (Item 1, Appendix E)
- Dry cleaning solvent (Item 3, Appendix E)
- Rags (Item 11, Appendix E)
- Fiberglass panel (as required)

a. REMOVAL

DOOR ASSEMBLIES

1. Remove left or right door assembly (see paragraph 5-28).
2. Remove fiberglass panels (4, 8, and 15) from door assembly (16). Discard fiberglass panels.

FRONT END PANEL ASSEMBLY

1. Remove front end panel assembly (see paragraph 4-82).
2. Remove fiberglass panel (7) from front end panel assembly (6). Discard fiberglass panel.

REAR END PANEL ASSEMBLY

1. Remove rear end panel assembly (see paragraph 5-29).
2. Remove fiberglass panel (13) from rear end panel assembly (14). Discard fiberglass panel.

RIGHT FRONT PANEL

1. Remove right front panel (see paragraph 5-30).
2. Remove fiberglass panel (5) from right front panel (3). Discard fiberglass panel.

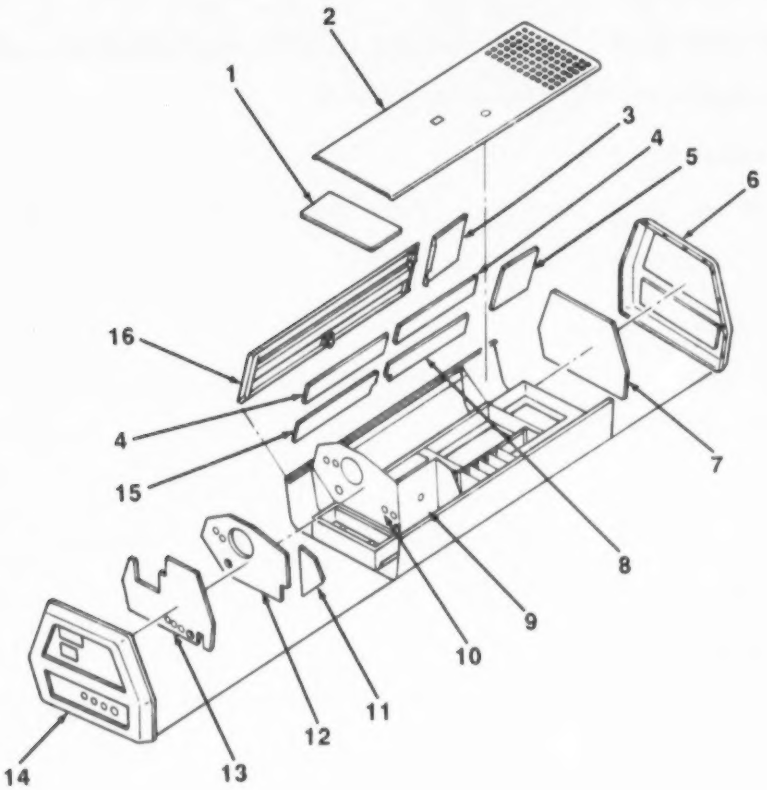
ROOF ASSEMBLY

1. Remove roof assembly (see paragraph 5-31).
2. Remove fiberglass panel (1) from roof assembly (2). Discard fiberglass panel.

ENGINE BAFFLE ASSEMBLIES

1. Remove engine baffle assemblies (see paragraph 5-27).
2. Remove fiberglass panels (11 and 12) from front and side engine baffle assemblies (9 and 10). Discard fiberglass panels.

5-33. FIBERGLASS PANELS REPLACEMENT (Con't).



b. CLEANING

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-130°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean fiberglass mounting surface with dry cleaning solvent and rags.

c. INSTALLATION

DOOR ASSEMBLIES

1. Install new fiberglass panels (4, 8, and 15) in place on door assembly (16) with adhesive.
2. Install door assembly (see paragraph 5-28).

TA505601

5-33. FIBERGLASS PANELS REPLACEMENT (Con't).

FRONT END PANEL ASSEMBLY

1. Install new fiberglass panel (7) in place on front end panel assembly (6) with adhesive.
2. Install front end panel assembly (see paragraph 4-82).

REAR END PANEL ASSEMBLY

1. Install new fiberglass panel (13) in place on rear end panel assembly (14) with adhesive.
2. Install rear end panel assembly (see paragraph 5-29).

RIGHT FRONT PANEL

1. Install new fiberglass panel (5) in place on right front panel (3) with adhesive.
2. Install right front panel (see paragraph 5-30).

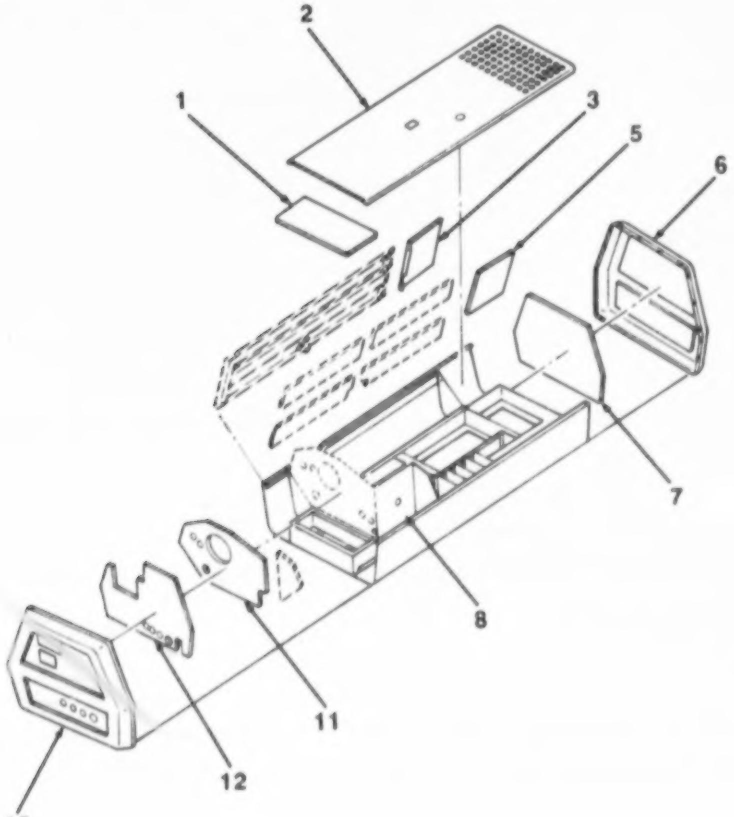
ROOF ASSEMBLY

1. Install new fiberglass panel (1) in place on roof assembly (2) with adhesive.
2. Install roof assembly (see paragraph 5-31).

ENGINE BAFFLE ASSEMBLIES

1. Install new fiberglass panels (11 and 12) in place on front and side engine baffle assemblies (9 and 10) with adhesive.
2. Install engine baffle assemblies (see paragraph 5-27).

5-33. FIBERGLASS PANELS REPLACEMENT (Con't).



TA505602

5-34. ROOF SIDE SUPPORT AND DOORSTOPS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Engine off.

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- One lockwasher
- One self-locking nut
- One self-locking screw

a. REMOVAL

NOTE

Use this task to remove any 1 of 3 doorstops or roof side support.

ROOF SIDE SUPPORT

1. Open right door assembly and access door.
2. Remove 6 screws (3) from roof side support (2), roof assembly (12), and rear wall baffle (1).
3. Remove roof side support (2).

DOORSTOP

1. Open left or right door assembly or access door to gain access to doorstop (5) being removed.
2. Remove nut (8), lockwasher (7), and lower end of door closure (4) from doorstop (5). Discard lockwasher.
3. Remove 3 screws (6) from rear panel assembly (11) and doorstop (5).
4. Remove self-locking nut (10), screw (9), and doorstop (5) from roof assembly (12). Discard self-locking nut and screw.

b. INSTALLATION

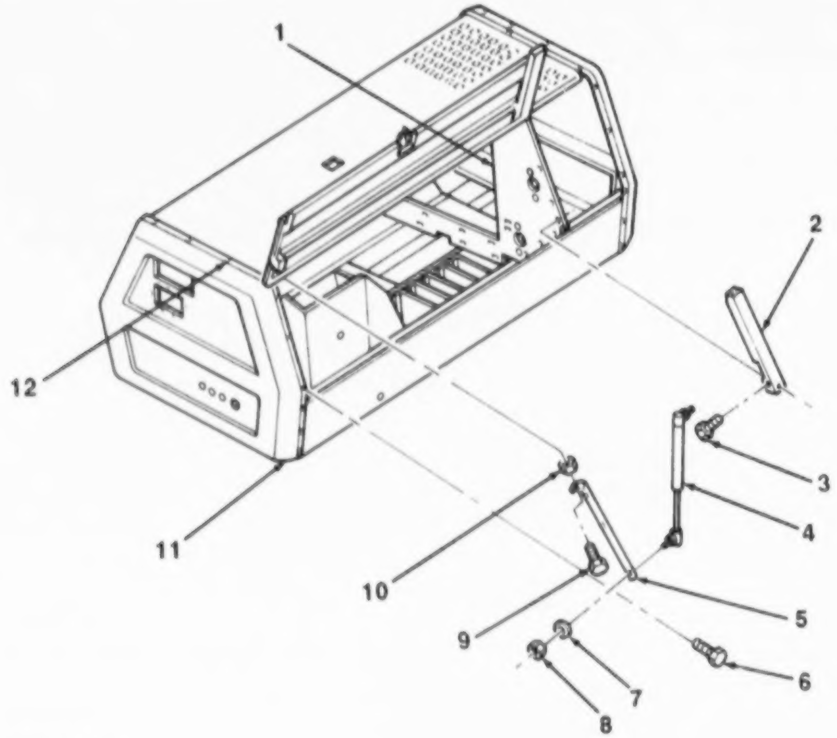
ROOF SIDE SUPPORT

1. Position roof side support (2) in place on trailer.
2. Install 6 screws (3) in roof assembly (12), rear wall baffle (1), and roof side support (2).

DOORSTOP

1. Position doorstop (5) in place on trailer and install new self-locking screw (9) and nut (10).
2. Install 3 screws (6) in rear panel assembly (11) and doorstop (5).
3. Insert lower end of door closure (4) in doorstop (5) and install nut (8) and new lockwasher (7).

5-34. ROOF SIDE SUPPORT AND DOORSTOPS REPLACEMENT (Con't).



FOLLOW-ON TASKS:

- Close door assemblies or access door.

TA505603

Section IX. AIR COMPRESSOR ASSEMBLY MAINTENANCE

Paragraph Number	Title	Page Number
5-35	Air Compressor Maintenance	5-83
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5-37	Oil Cooler Replacement	5-91
5-38	Compressor Coupling and Mounting Repair	5-93
5-39	Unloader Valve Assembly Repair	5-95

5-35. AIR COMPRESSOR MAINTENANCE.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Equipment Conditions:

- Engine removed (see paragraph 5-5).

Tools/Test Equipment:

- General mechanic's tool kit
- Hoist, 1000 pound minimum capacity

Materials/Parts:

- Sealing compound (Item 12, Appendix E)
- Lifting eyebolt (see Appendix G)
- One gasket
- Two seal assemblies
- Three preformed packings
- Nine lockwashers

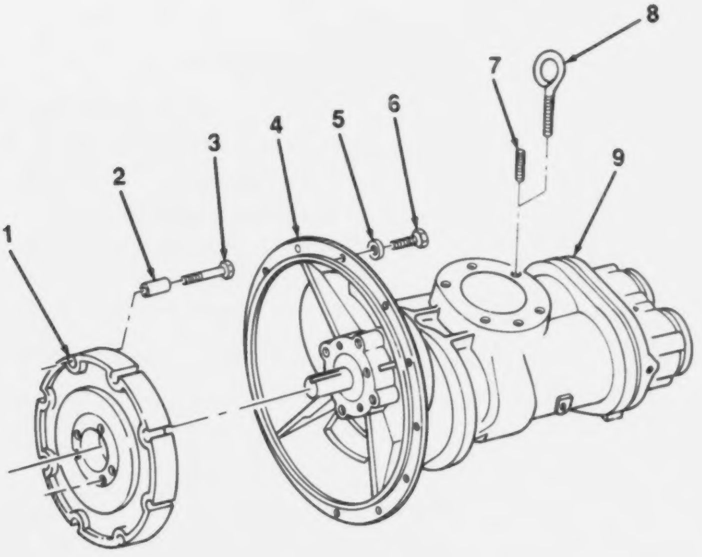
5-35. AIR COMPRESSOR MAINTENANCE (Con't).

a. REMOVAL

CAUTION

Ensure that engine is suitably supported before removing compressor. Engine and compressor may be damaged.

1. Remove unloader valve mounting stud (7) from compressor (9) and install lifting eyebolt (8). Attach suitable hoist to lifting eyebolt.
2. Using 36 mm socket and handle, turn crankshaft as needed to gain access to and remove 8 mounting capscrews (3) and spacers (2) from coupling (1).
3. Remove 9 capscrews (6) and lockwashers (5) from gear case (4). Discard lockwashers.
4. Using hoist, remove compressor (9) from engine and place on suitable support.
5. Remove hoist and lifting eyebolt (8) from compressor (9).

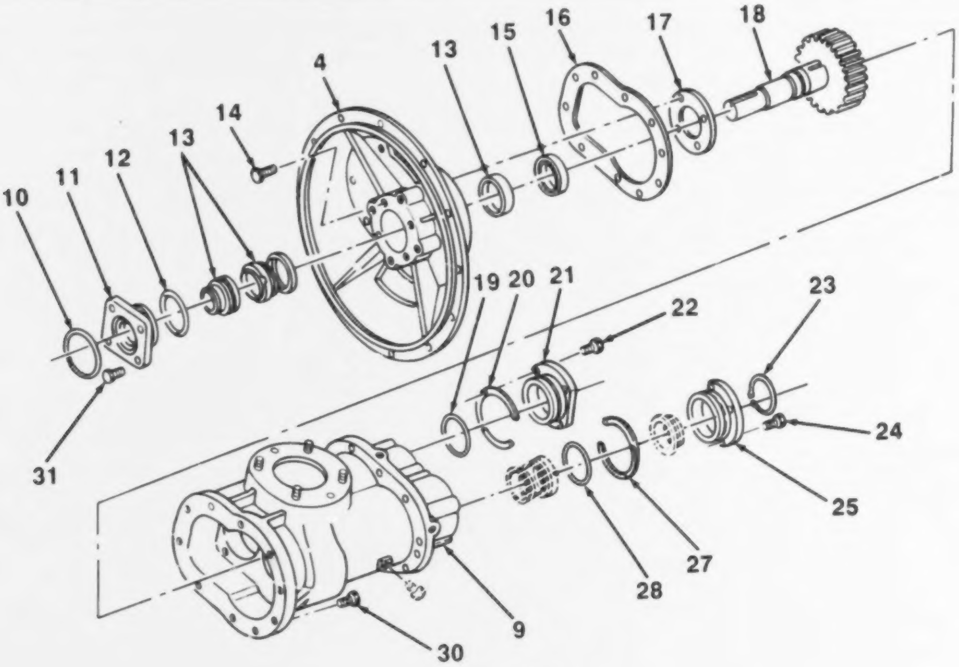


b. DISASSEMBLY

1. Remove compressor coupling and mounting (see paragraph 5-38).
2. Remove 4 screws (31) and retaining plate (11) from gear case (4).
3. Remove preformed packing (12) from retaining plate (11). Discard preformed packing.

TA505604

5-35. AIR COMPRESSOR MAINTENANCE (Con't).



CAUTION

Shaft seal assembly consists of three parts. Rear part of shaft seal assembly may be bonded to shaft and cannot be removed until gear case is removed from housing.

4. Remove retaining ring (10) and front part of shaft seal assembly (13) from retaining plate (11).

5. Remove middle part of shaft seal assembly (13) from shaft (18). Discard front and middle parts of shaft seal assembly.

6. Remove 10 capscrews (30), gear case (4), and gasket (16) from housing (9). Discard gasket.

7. Remove 4 socket head capscrews (14) from gear case (4) and retaining plate (17). Remove shaft (18), retaining plate, bearing (15), and rear part of shaft seal assembly (13) from gear case.

8. Remove rear part of shaft seal assembly (13), bearing (15), and retaining plate (17) from shaft (18).

NOTE

Bearing races may fall out of housing when bearing cover is removed. If so, install bearing races back in housing.

9. Remove 4 screws (22), bearing cover (21), and shims (20) from housing (9). Remove preformed packing (19) from bearing cover. Discard preformed packing.

10. Remove 4 screws (24), bearing cover (25), and shims (27) from housing (9). Remove preformed packing (28) from bearing cover. Discard preformed packing.

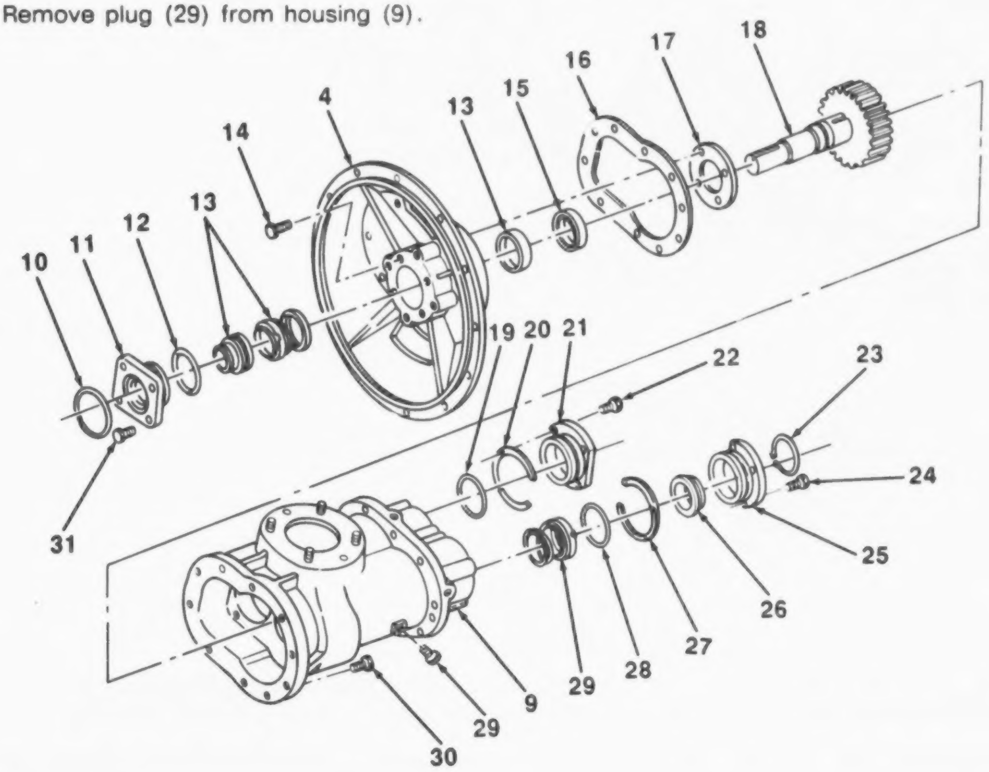
11. Remove retaining ring (23) from bearing cover (25).

TA505605

5-35. AIR COMPRESSOR MAINTENANCE (Con't).

12. Remove seal (26) from shaft and bearing cover (25). Discard seal.

13. Remove plug (29) from housing (9).



c. ASSEMBLY

1. Install plug (29) in housing (9).

NOTE

Front part of seal must be installed on shaft and rear part of seal on bearing cover.

2. Install new seal (26) on shaft and in bearing cover (25).

3. Install retaining ring (23) and new preformed packing (28) on bearing cover (25).

4. Align mounting holes in bearing cover (25) and shims (27) and install on housing (9) with 4 screws (24). Tighten screws to 32 lb.-ft. (43 N•m).

5. Install new preformed packing (19) on bearing cover (21). Align mounting holes in bearing cover and shims (20) and install on housing (9) with 4 screws (22). Tighten screws to 32 lb.-ft. (43 N•m).

6. Install retaining plate (17), bearing (15), and rear part of shaft new seal assembly (13) on shaft (18). Install shaft in gear case (4).

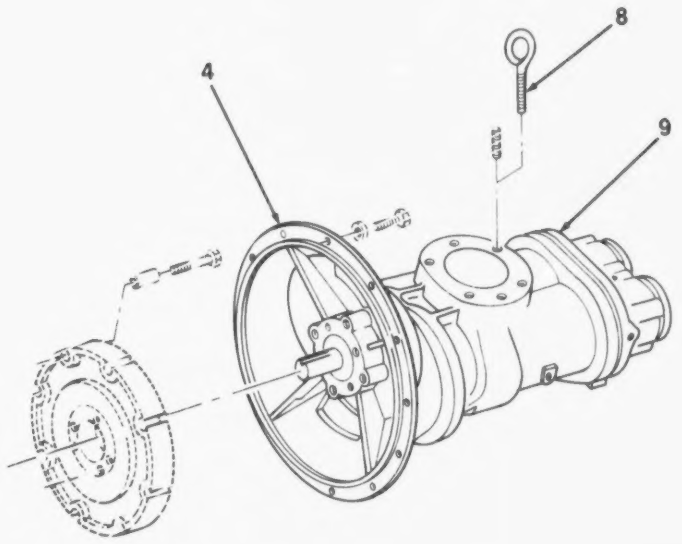
TA505606

5-35. AIR COMPRESSOR MAINTENANCE (Con't).

7. Apply a light coat of sealing compound to threads of 4 socket head capscrews (14). Install socket head capscrews in gear case (4) and retaining plate (17). Tighten socket head capscrews to 18 lb.-ft. (24.40 N•m).
8. Install gear case (4) and new gasket (16) on housing (9) with 10 capscrews (30). Tighten capscrews to 58 lb.-ft. (78.50 N•m).
9. Install middle part of new shaft seal (13) on shaft (18) and front part of shaft seal in retaining plate (11).
10. Install new preformed packing (12) and retaining ring (10) on retaining plate (11).
11. Install retaining plate (11) on gear case (4) with 4 capscrews (31). Tighten capscrews to 32 lb.-ft. (43 N•m).
12. Install compressor coupling and mounting (see paragraph 5-38).

d. INSTALLATION

1. Install lifting eyebolt (8) in compressor (9). Attach hoist to lifting eyebolt.
2. Using hoist, position compressor (9) in place on engine.



TA505607

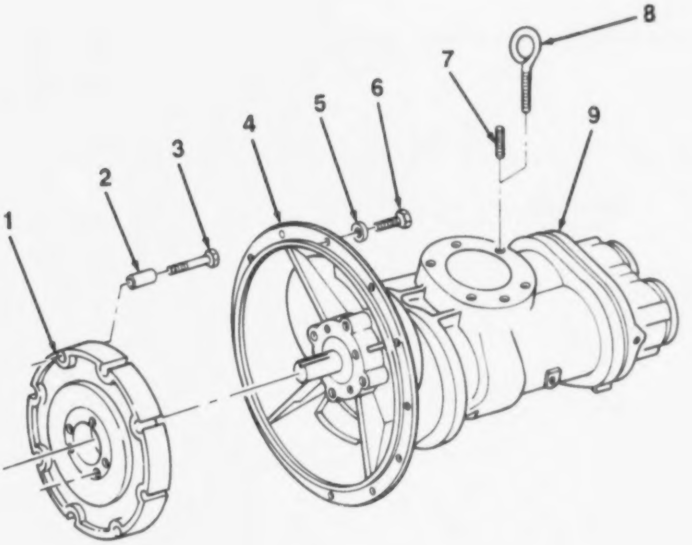
5-35. AIR COMPRESSOR MAINTENANCE (Con't).

3. Using 36 mm socket and handle, turn crankshaft as needed to gain access to coupling mounting holes.

4. Install 8 capscrews (3) and spacers (2) to secure coupling (1) to engine flywheel.

5. Install 9 capscrews (6) and new lockwashers (5) in gear case (4) and engine.

6. Remove hoist and lifting eyebolt (8) from compressor (9). Install unloader valve mounting stud (7) in compressor.



FOLLOW-ON TASKS:

- Install engine (see paragraph 5-5).

TA505608

5-36. OIL TEMPERATURE BYPASS VALVE MAINTENANCE.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Equipment Conditions:

- Compressor oil lines and fittings removed (see paragraph 4-86).

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- One preformed packing
- Four gaskets

a. REMOVAL

1. Remove 2 screws (3), 2 screws (6), 4 screws (5), and washers (4).

NOTE

After removing oil temperature bypass valve, clean all gasket material off oil temperature bypass valve and oil cooler.

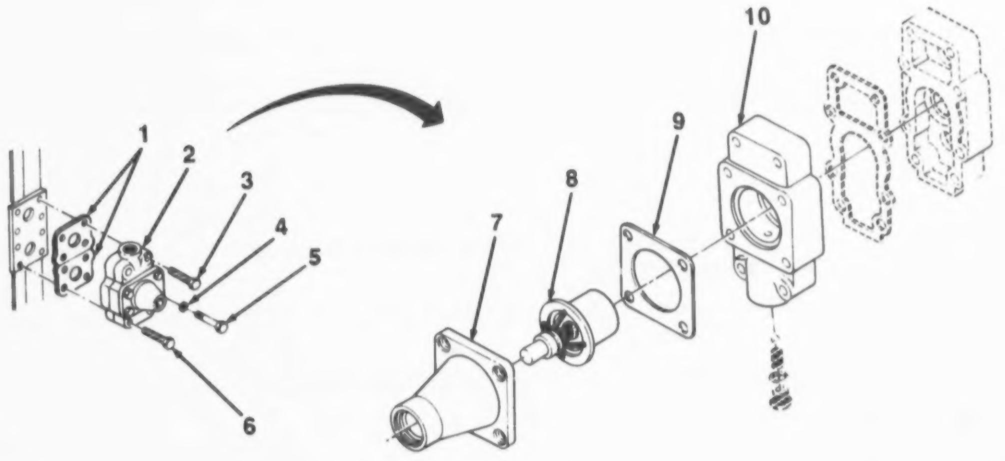
2. Remove oil temperature bypass valve (2) and 2 gaskets (1) from oil cooler. Discard gaskets.

b. DISASSEMBLY

NOTE

Clean access cover and outer body of gasket material.

1. Separate access cover (7) and gasket (9) from outer body (10). Discard gasket.
2. Remove thermostat (8).



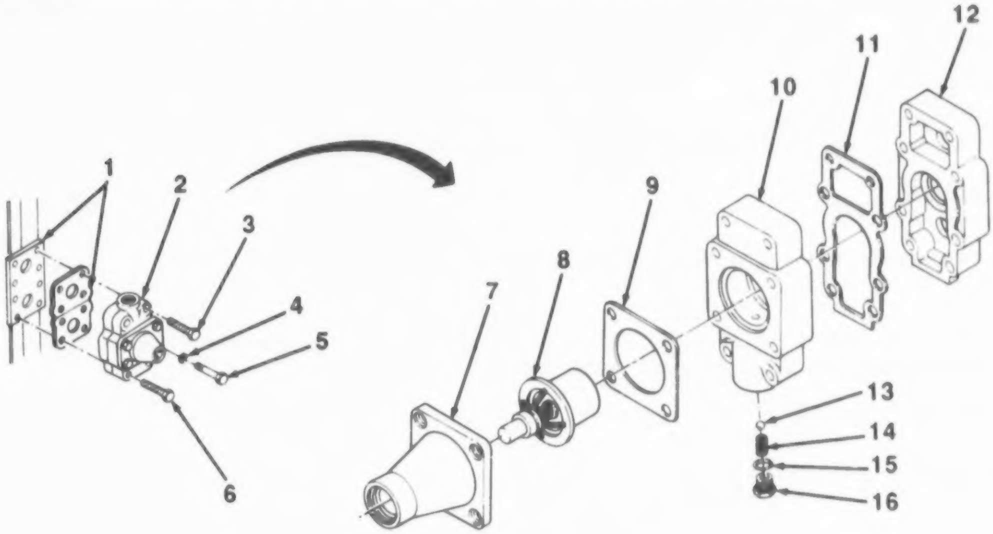
TA505609

5-36. OIL TEMPERATURE BYPASS VALVE MAINTENANCE (Con't).

NOTE

Clean outer and inner bodies of gasket material.

3. Separate outer body (10) from inner body (12) and remove gasket (11). Discard gasket.
4. Remove plug (16), spring (14), and ball (13) from outer body (10).
5. Remove preformed packing (15) from plug (16). Discard preformed packing.



c. ASSEMBLY

1. Position new preformed packing (15) on plug (16).
2. Place ball (13) and spring (14) in plug (16) and install plug in outer body (10).
3. Install thermostat (8) in outer body (10).
4. Position new gasket (11) on inner body (12). Aline mounting holes of outer body (10) and place on inner body.
5. Position new gasket (9) on outer body (10). Place access cover (7) on outer body.

d. INSTALLATION

NOTE

Access cover, outer body, and inner body are not secured together at this time. Hold together for mounting purposes.

1. Position 2 new gaskets (1) and oil temperature bypass valve (2) in place on oil cooler and install 4 screws (5) and washers (4).
2. Install 2 screws (3) and 2 screws (6) in oil temperature bypass valve (2).

FOLLOW-ON TASKS:

- Install compressor oil lines and fittings (see paragraph 4-86).
- Fill oil compressor (see LO 5-4310-452-14).

TA505610

5-37. OIL COOLER REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Equipment Conditions:

- Compressor fan and fan drive removed (see paragraph 4-92).
- Compressor oil lines and fittings removed (see paragraph 4-86).
- Oil temperature bypass valve removed (see paragraph 5-36).
- Front end panel assembly removed (see paragraph 4-82).

Materials/Parts:

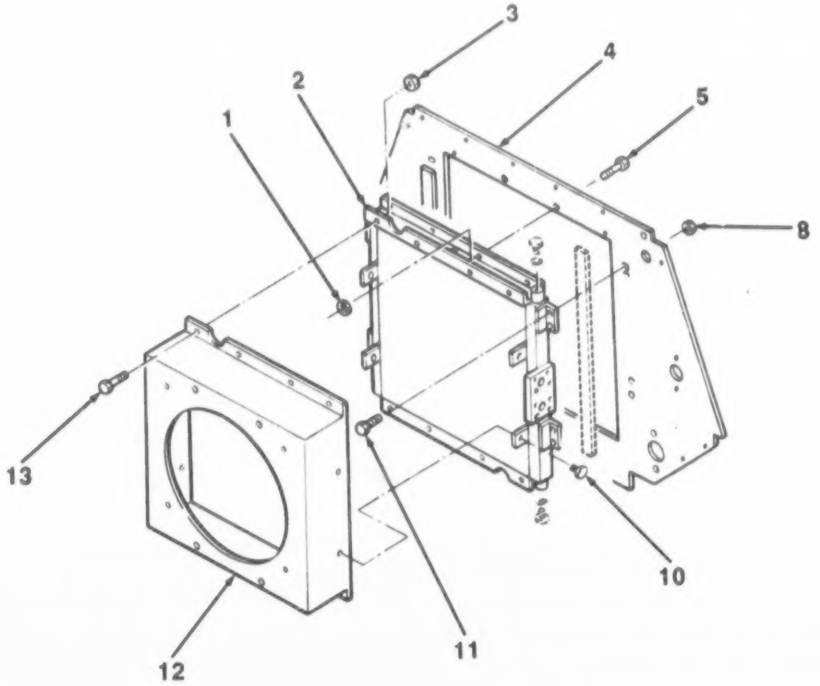
- One preformed packing
- Two rubber strips

Tools/Test Equipment:

- General mechanic's tool kit

a. REMOVAL

1. Remove 8 screws (13) and nuts (3) from fan shroud (12) and oil cooler (2).
2. Remove 4 screws (10) and lift fan shroud (12) from oil cooler (2).
3. Remove 8 screws (5) and nuts (1) from oil cooler (2).
4. Remove 8 screws (11), nuts (8), and oil cooler (2) from rear wall baffle (4).



TA505611

5-37. OIL COOLER REPLACEMENT (Con't).

5. Remove plug (6) and preformed packing (7) from oil cooler (2). Discard preformed packing.

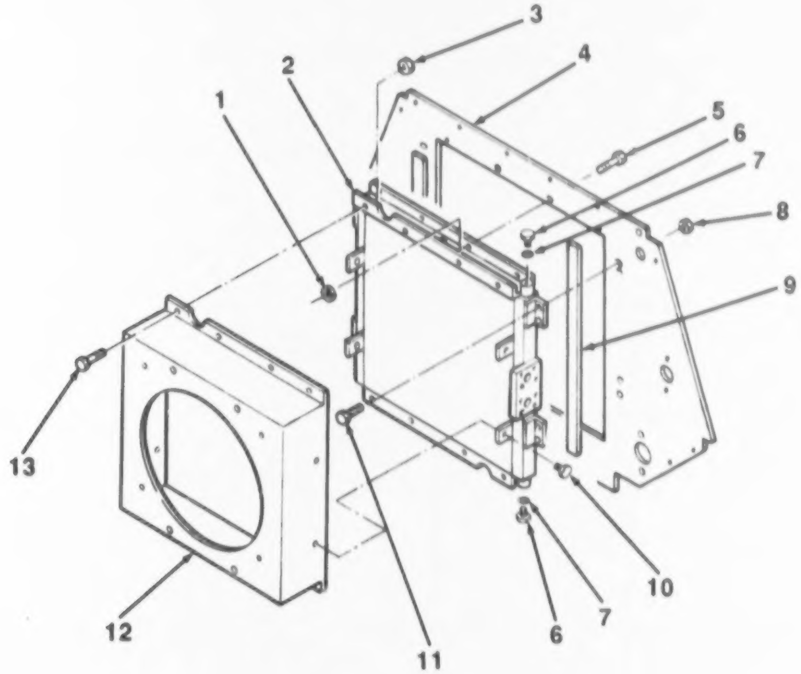
NOTE

Clean oil cooler and rear wall baffle of rubber strips.

6. Remove 2 rubber strips (9). Discard rubber strips.

b. INSTALLATION

1. Position 2 new rubber strips (9) in place on rear wall baffle (4).
2. Install new preformed packing (7) on plug (6). Install plug in oil cooler (2).
3. Aline mounting holes of oil cooler (2) with holes in rear wall baffle (4) and install 8 screws (11) and nuts (8).
4. Install 8 screws (5) and nuts (1).
5. Aline mounting holes in fan shroud (12) with mounting holes in oil cooler (2) and install 8 screws (13), nuts (3), and 4 screws (10).



FOLLOW-ON TASKS:

- Install front end panel assembly (see paragraph 4-82).
- Install oil temperature bypass valve (see paragraph 5-36).
- Install compressor oil lines and fittings (see paragraph 4-86).
- Install compressor fan and fan drive (see paragraph 4-92).

TA505612

5-38. COMPRESSOR COUPLING AND MOUNTING REPAIR.

This Task Covers:

a. Disassembly

b. Assembly

Initial Setup:

Equipment Conditions:

- Compressor removed from engine (see paragraph 5-35).

General Safety Instructions:

- Compressed air used for drying or cleaning purposes must not exceed 30 psi (207 kPa).

Materials/Parts:

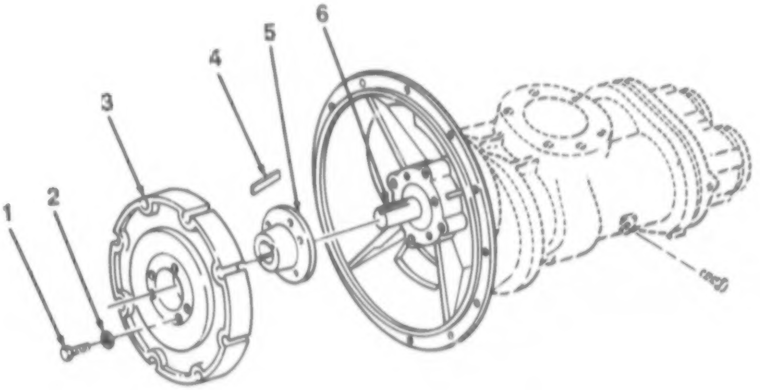
- Sealing compound (Item 12, Appendix E)

Tools/Test Equipment:

- General mechanic's tool kit

a. DISASSEMBLY

1. Remove 3 screws (1) and washers (2) from coupling (3) and bushing (5).
2. Install 2 screws (1) in threaded jack screw holes in coupling (3). Tighten screws until coupling is free of bushing (5).
3. Remove bushing (5) and key (4) from shaft (6).
4. Remove screws (1) from coupling (3).



b. ASSEMBLY

1. Install key (4) in keyway of shaft (6). Position bushing (5), flange end first, on key and shaft.
2. Position coupling (3) on bushing (5).
3. Apply a light coat of sealing compound on threads of 3 screws (1). Install, but do not tighten, 3 screws and washers (2) in coupling (3).

TA505813

5-38. COMPRESSOR COUPLING AND MOUNTING REPAIR (Con't).

CAUTION

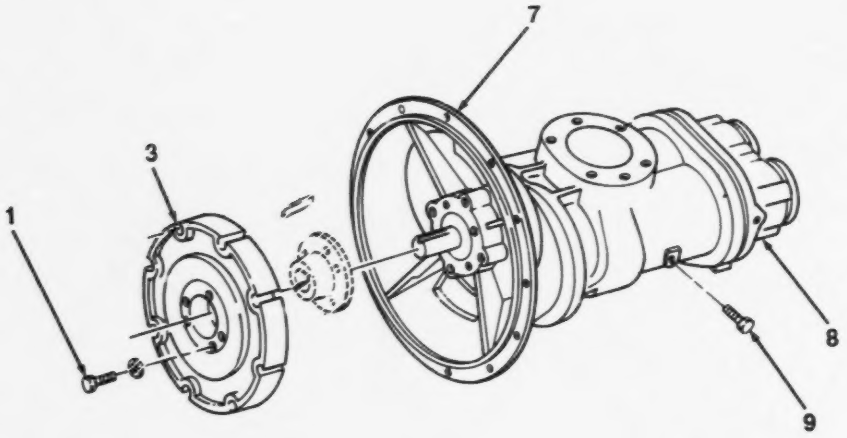
Dimension in step 4 must be observed when tightening screws to prevent damage to engine crankshaft.

4. Tighten screws (1) evenly, until outside face of coupling (3) is 2.06 in. (52.34 mm) from mounting flange (7) of gear case (8).

WARNING

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.

5. Remove plug (9) from gear case (8) and pressure test compressor by injecting 100 psi (689.5 kPa) of compressed air.
6. Check all gaskets for evidence of leaks.
7. Install plug (9) in gear case (8).



FOLLOW-ON TASKS:

- Install compressor on engine (see paragraph 5-35).

TA505614

5-39. UNLOADER VALVE ASSEMBLY REPAIR.

This Task Covers:

a. Disassembly

b. Assembly

Initial Setup:

Equipment Conditions:

- Unloader valve assembly removed (see paragraph 4-90).

Tools/Test Equipment:

- General mechanic's tool kit

Materials/Parts:

- One gasket
- Two preformed packings

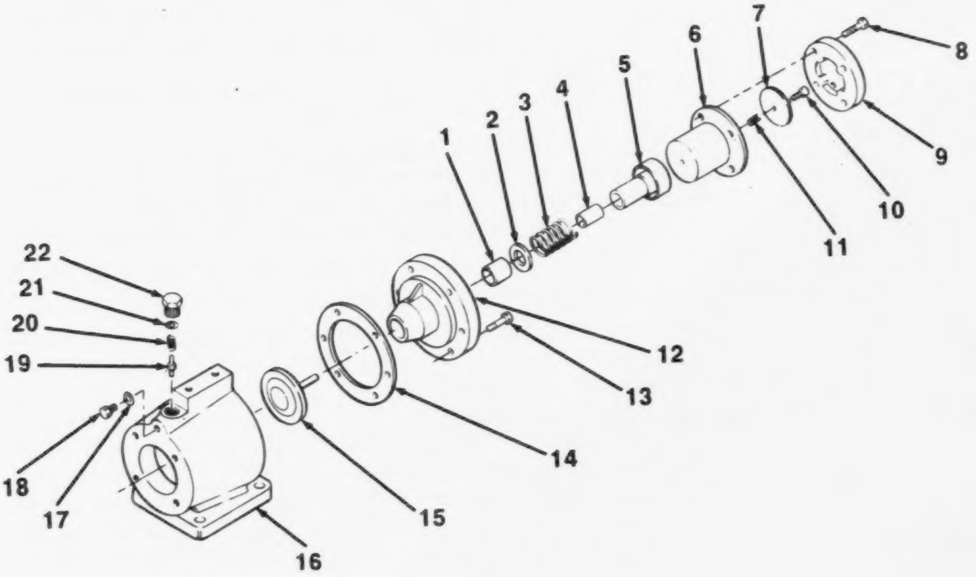
a. DISASSEMBLY

1. Remove 4 screws (8) and access cover (9) from housing (12).

NOTE

Washer may remain in housing or stay on piston.

2. Remove washer (2) and main unloader valve spring (3) from piston (5).
3. Remove screw (10), washer (7), packing retainer (6), and spring (11) from piston (5).
4. Pull bushing (1) and sleeve (4) from piston (5).
5. Remove 6 screws (13).
6. Remove housing (12), gasket (14), and valve (15) from valve body (16). Discard gasket.
7. Remove plug (22), spring (20), and pin (19) from valve body (16).
8. Remove preformed packing (21) from plug (22). Discard preformed packing.
9. Remove plug (18) and remove preformed packing (17) from plug. Discard preformed packing.



TA505615

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5-39. UNLOADER VALVE ASSEMBLY REPAIR (Con't).

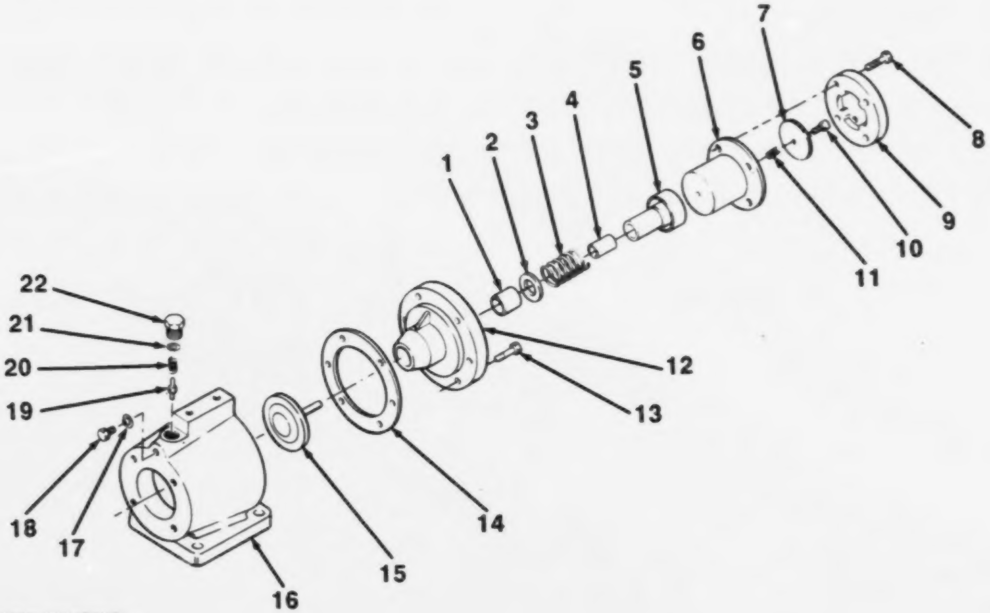
b. ASSEMBLY

1. Install new preformed packing (17) on plug (18) and install in valve body (16).

NOTE

Pin must be installed in valve body with small diameter side down.

2. Install pin (19) and spring (20) in valve body (16).
3. Install new preformed packing (21) on plug (22) and install in valve body (16).
4. Install valve (15), new gasket (14), and housing (12) on valve body (16) with 6 screws (13).
5. Install sleeve (4) and bushing (1) in piston (5).
6. Install packing retainer (6), washer (7), and spring (11) on piston (5) with screw (10).
7. Install main unloader valve spring (3) and washer (2) on piston (5) and install over shaft of valve (15) in housing (16).
8. Install access cover (9) with 4 screws (8).



FOLLOW-ON TASKS:

- Install unloader valve assembly (see paragraph 5-39).

TA505616

APPENDIX A
REFERENCES

A-1. SCOPE.

This appendix lists forms, field manuals, technical manuals, and other publications referenced in this manual and which apply to operation, organizational maintenance, and direct support and general support maintenance of the 250 CFM Trailer-Mounted Compressor.

A-2. DEPARTMENT OF THE ARMY PAMPHLETS.

Consolidated Index of Army Publications and Blank Forms	DA Pam 25-30
The Army Maintenance Management Systems (TAMMS)	DA Pam 738-750

A-3. SUPPLY CATALOG.

Pnuematic Tool Compressor Outfit: 250 CFM; Trailer-Mounted	SC 3820-98-CL-E09

A-4. FORMS.

Routing Slip	DA Form 1222
Recommended Changes to Publications and Blank Forms	DA Form 2028
Recommended Changes to Equipment Technical Manuals	DA Form 2028-2
Depreservation Guide for Vehicles and Equipment	DA Form 2258
Equipment Inspection and Maintenance Worksheet	DA Form 2404
Equipment Control Record	DA Form 2408-9
Maintenance Request	DD Form 2407
Product Quality Deficiency Report	SF 368

A-5. ARMY REGULATIONS.

Dictionary of United States Army Terms	AR 310-25
Authorized Abbreviations and Brevity Codes	AR 310-50

A-6. TECHNICAL MANUALS.

Unit, Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools Lists) for Compressor Unit, Rotary: Air, Trailer Mounted, 250 CFM P-250-WDM-H268	TM 5-4310-452-24P
Administrative Storage of Equipment	TM 740-90-1
Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use	TM 750-244-6
Inspection, Care, and Maintenance of Antifriction Bearings	TM 9-214
Operator's Manual for Truck: 5-Ton, M939 and M939A1 Series; Truck, Cargo: 5-Ton, M923, M923A1, M925, and M925A1 Series; Truck, Cargo: 5-Ton, M924, M924A1, M926, and M926A1 Series; Truck, Cargo: 5-Ton, XLWB, M927, M927A1, M928, and M928A1 Series; Truck, Dump: 5-Ton, M929, M929A1, M930, M930A1, M931, M931A1, M932, and M932A1 Series; Truck, Van, Expandable: 5-Ton, M934, M934A1, M935, and M935A1 Series; Truck, Medium Wrecker: 5-Ton, M936, and M936A1 Series	TM 9-2320-272-10

A-6. TECHNICAL MANUALS (Con't).

Operator, Organizational, Direct Support, and General Support Maintenance Care Maintenance, Repair, and Inspection of Pneumatic Tires and Inner Lubes	TM 9-2610-200-14
Operator's, Organizational, Direct Support and General Support Maintenance Manual for Lead-Acid Storage Batteries	TM 9-6140-200-14
Packing of Materiel: Preservation (Volume 1 and Volume 2)	TM 38-230-2

A-7. LUBRICATION ORDER.

Compressor, Rotary, Air, DED, 250 CFM, 100 psi, Trailer-Mounted (NSN 4310-01-158-3262) Ingersoll-Rand Model P-250-WDM-H268 Component of Pnuematic Tool and Compressor Outfit (NSN 3820-00-950-8584)	LO 5-4310-452-12

APPENDIX B
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. GENERAL.

a. This section provides a general explanation of all maintenance and repair functions authorized at the various maintenance levels.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS.

Maintenance functions will be limited to and defined as follows:

a. **Inspect.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. **Service.** Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), preserve, drain, paint, or replenish fuel, lubricants, chemical fluids, or gases.

d. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. **Aline.** To adjust specified variable elements of an item to bring about optimum or desired performance.

f. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. **Remove/Install.** To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. **Replace.** To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the third position of the SMR code.

i. **Repair.** The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

B-2. MAINTENANCE FUNCTIONS (Con't).

j. **Overhaul.** That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. **Rebuild.** Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

a. **Column 1, Group Number.** Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "00."

b. **Column 2, Component/Assembly.** Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. **Column 3, Maintenance Function.** Column 3 lists the functions to be performed on the item listed in Column 2. (For a detailed explanation of these functions, see paragraph B-2.)

d. **Column 4, Maintenance Level**. Column 4 specifies, by the listing of a *work time* figure in the appropriate subcolumn(s), the level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the Maintenance Allocation Chart. The symbol designations for the various maintenance levels are as follows:

C	.... *Unit (Operator or Crew)*
O	.... *Unit Organizational Maintenance*
F	.... *Direct Support Maintenance*
H	.... *General Support Maintenance*
D	.... *Depot Maintenance*

e. **Column 5, Tools and Equipment.** Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. **Column 6, Remarks.** This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in Section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III.

a. **Column 1, Tool or Test Equipment Reference Code.** The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. **Column 2, Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III (Con't).

c. **Column 3, Nomenclature**. Name or identification of the tool or test equipment.

d. **Column 4, National/NATO Stock Number**. The National or NATO Stock Number of the tool or test equipment.

e. **Column 5, Tool Number**. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.

a. **Column 1, Reference Code**. The code recorded in Column 6, Section II.

b. **Column 2, Remarks**. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
01	**ENGINE**								
0100	*Engine Assembly*	Inspect	0.5					1	
		Test			0.6			1	
		Service	0.5	1.0				1	
		Replace			9.0			1,2,3	
		Repair			8.0	46.0		1,2,3,4	B
		Overhaul					46.0	1,2,3,4	
0101	*Crankcase, Block, Cylinder Head*								
	Engine Block	Replace				48.0		1,2,3,4	
		Repair				8.0		1,2,3,4	
0102	*Crankshaft*	Inspect				1.0		1,2,3,4	
		Replace				11.0		2	
0103	*Flywheel Assembly*	Inspect		1.0					
		Replace			9.0			1	
		Repair			10.0			1	B
0104	*Pistons, Connecting Rods*	Test				1.0		2	
		Replace				3.0		1,2,3,4	
		Repair				4.0		1,2,3,4	
0105	*Valves, Camshafts, and Timing System*								
	Valve Train Mechanism	Adjust		2.5				1,2	
		Replace			3.5			1,2	
		Repair			4.5			1,2,3	
	Timing Gears	Replace			8.5			1,2,3	
		Repair			9.5			1,2,3	B

Section II. MAINTENANCE ALLOCATION CHART (Con't)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0105	*Valves, Camshafts, and Timing System (Con't)*								
	Cylinder Head with Valves	Test			1.0			2	
		Replace			4.0			1,2,3,4	
		Repair				3.0		1,2,4	
	Camshaft	Replace				10.5		1,2,3,4	
0106	*Engine Lubrication System*								
	Oil Cooler	Inspect	0.5						
		Service		1.0				1	
		Replace		2.0				1	
	Oil Filter	Replace		0.5					
	Filter Base Assembly	Replace		1.0				1	
	Oil Pump	Test			0.5			1,2	
		Replace			2.0			1,2	
0108	*Manifolds*	Replace		2.0				1	
03	**FUEL SYSTEM**								
0301	*Carburetor, Fuel Injector*	Test			1.0			1,2,3	
		Replace			1.0			1,2,3	
		Repair				1.0		1,2,3,4	
0302	*Fuel Pumps*								
	Injector Pump	Test					2.0	1,2,3,4	A
		Adjust				1.0		1,2,3,4	
		Replace			5.0			1,2,3,4	
		Repair					3.5	1,2,3,4	B
		Overhaul					8.0		
	Metering Fuel Pump	Service		0.5				1,2	
		Replace		0.5				1,2	
		Repair		0.5				1,2	
0304	*Air Cleaner*	Inspect	0.2						
		Service		0.5				1	
		Replace		0.5				1	
		Repair		1.0				1	B
0306	*Tanks, Lines, Fittings, Headers*								
	Fuel Tank	Replace		2.0				1	
		Repair		0.5				1,2	B

Section II. MAINTENANCE ALLOCATION CHART (Con't)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level Unit C	Unit O	DS F	GS H	Depot D	(5) Tools and Equipment	(6) Remarks
0308	*Engine Speed Governor and Controls*								
	Throttle Control	Adjust		0.5				1	G
		Service		0.5				1	
		Replace		1.0				1	
	Governor	Calibrate					0.5	1,2,3,4	G
		Replace					5.0		
		Repair					3.0	1,2,3,4	
0309	*Fuel Filters*	Replace		0.5				1,2	
	Water Separator Element	Service	0.2						C
		Replace		0.5				1,2	
		Repair		0.5				1,2	
0311	*Engine Starting Aids*	Service		0.2				1	
		Replace		1.0				1	
		Repair		1.0				1	B
04	**EXHAUST SYSTEM**	Replace		1.0				1	
05	**COOLING SYSTEM**								
0502	*Cowling, Deflectors, Air Ducts, Shrouds*	Inspect		0.2					
		Replace		1.0				1	
0505	*Fan Assembly*	Inspect	0.2						
		Service		1.0				1	
		Replace		3.5				1	
		Repair		4.0				1	B
	Idler Pulley	Inspect		0.2					
		Replace		1.0				1	
		Repair			1.5			1,2,3	
06	**ELECTRICAL SYSTEM**								
0601	*Generator, Alternator*	Test		1.0				1,2	
		Replace		1.0				1	
		Repair			0.7			1,2	
	Alternator Belt	Adjust		0.5				1	G
		Replace		0.5				1	
0602	*Generator Regulator*								
	Voltage Regulator	Test		0.5				1,2	D
		Replace		0.5				1	

Section II. MAINTENANCE ALLOCATION CHART (Con't)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
Group Number	Component/Assembly	Maintenance Function	Unit		DS	GS	Depot	Tools and Equipment	Remarks
			C	O	F	H	D		
0603	*Starting Motor*	Test		0.5				1,2	
		Replace		1.0				1	
		Repair			2.5			1,2	
0606	*Engine Safety Controls*								
	Low Oil Pressure Switch	Test		0.5				1,2	
		Replace		0.5				1	
	Belt Break Switch	Adjust		0.5				1	G
		Replace		0.5				1	
	Oil Temperature Switch	Test		0.5				1,2	
		Replace		0.5				1	
0607	*Instrument or Engine Control Panel*	Test		0.5					
		Replace		2.0				1	
		Repair		0.5				1,2	B
0608	*Miscellaneous Items*								
	Junction Box	Replace		2.0				1,2	
		Repair		1.0				1,2	B
0609	*Lights*	Replace		0.5				1	
		Repair		1.0				1,2	B
0612	*Batteries, Storage*	Inspect	0.2						
		Service		0.5				1	
		Replace		0.5				1	
0613	*Hull or Chassis Wiring Harness*	Replace		1.0				1	
		Repair		3.5				1	E
10	**FRONT AXLE**								
1000	*Front Axle Assembly*	Replace			8.0			1,2	
		Repair			2.0			1,2	
11	**REAR AXLE**								
1100	*Rear Axle Assembly*	Replace			8.0			1,2	
		Repair			2.0			1,2	B
12	**BRAKES**								
1201	*Handbrakes*								
	Parking Brake	Adjust	0.2						G
		Replace		2.0				1	
		Repair		1.0				1	B

Section II. MAINTENANCE ALLOCATION CHART (Con't)

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
1202	*Service Brakes*	Inspect		1.0					
		Adjust		0.5				1	G
		Replace		2.0				1	
		Repair		2.0				1	
1204	*Hydraulic Brake System*								
	Master Cylinder	Replace		1.5				1	
1208	*Air Brake System*	Replace		2.0				1	
		Repair		1.0				1	B
13	**WHEELS AND TRACKS**								
1311	*Wheel Assembly*	Inspect		0.5				1	
		Replace		1.0				1	
		Repair		1.0				1	F
1313	*Tires, Tubes, Tire Chains*	Replace		1.0				1	
		Repair		1.5				1	
15	**FRAME, TOWING ATTACHMENTS, DRAWBARS, AND ARTICULATION SYSTEMS**								
1501	*Frame Assembly*	Replace				15.0		1,2	
		Repair				3.0		1,2	J
1503	*Pintles and Towing Attachments*								
	Drawbar, Lunette	Inspect	0.2						
		Replace		0.5				1	
1504	*Spare Wheel Carrier and Tire Lock*	Inspect	0.1						
		Replace		0.2				1	
1507	*Landing Gear, Leveling Jacks*	Inspect	0.2						
		Replace		0.5				1	
		Repair		0.5				1	B
16	**SPRINGS AND SHOCK ABSORBERS**								
1601	*Springs*	Replace			5.0			1	
1604	*Shock Absorber Equipment*								
	Shocks	Inspect		0.5					
		Replace		1.0				1	

Section II. MAINTENANCE ALLOCATION CHART (Con't)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Unit		DS	GS	Depot		
			C	O	F	H	D		
18	**BODY, CAB, HOOD AND HULL**								
1801	*Body, Cab, Hood, and Hull Assemblies*	Replace		2.0	7.0			1	
		Repair			3.0			1	B
		Overhaul					50.0		
1802	*Fenders*	Inspect	0.1						
		Replace			1.0			1	
1808	*Stowage Racks, Boxes, Straps, Carrying Cases, Cable Reels, Hose Reels, Etc.*	Replace		1.0				1	
		Repair		1.0	2.0			1	H
22	**BODY, CHASSIS AND HULL ACCESSORY ITEMS**								
2210	*Data Plates and Instruction Holders*	Replace		0.5				1	
50	**PNEUMATIC EQUIPMENT**								
5000	*Air Compressor Assembly*	Inspect	0.5					1	
		Test		2.0				1	
		Service	0.5					1	
		Replace			5.0			1,2	
		Repair				13.8		2	B
		Overhaul					2.5		
5006	*Lubrication System*								
	Oil Temperature Bypass Valve	Test		0.3					
		Replace			0.5			1	
		Repair			1.5			1	B
	Oil Cooler	Service		0.5					
		Replace			1.5			1	
	Oil Filter	Service		0.5					
		Replace		0.2					
	Filter Base Assembly	Replace		1.5				1	
	Oil Separator	Service		2.0					
		Replace		2.5				1	
		Repair		3.0				1	

Section II. MAINTENANCE ALLOCATION CHART (Con't)

(1)	(2)	(3)	(4)					(5)	(6)
			Maintenance Level						
			Unit		DS	GS	Depot		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
5007	*Compressor Drive*	Replace				8.5		1,2	
		Repair				14.5		1,2	B
5008	*Air Intakes*								
	Air Cleaner Assembly	Service	0.5	1.0					
		Replace		1.0				1	
		Repair		1.5				1	B
5009	*Unloader System Components*								
	Unloader Valve Assembly	Replace		1.0				1	
		Repair			2.5			1	
5010	*Compressor Cooling and Heating*								
	Fan Assembly	Replace		2.0				1	
		Repair		2.5				1	
	Fan Belt	Adjust		0.3				1	G
		Replace		1.5				1	
5012	*Throttling Devices*								
	Air Piping and Regulation	Adjust	0.2						G
		Replace		1.0				1	
5015	*Air Discharge System*								
	Service Manifold	Replace		1.0				1	
	Minimum Pressure Valve	Replace		0.5				1	
		Repair		1.0				1	
	Hose Reel Assembly	Service		0.2					
		Replace		2.0				1	
		Repair		2.5				1	B

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Tool or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
1	O,F,H	General Mechanic's Tool Set (SC 5180-90-CL-N26)	5180-00-177-7033	W33004
	O,F,H	Organizational Maintenance, Common #1, Less Power (SC 4910-95-CL-A74)	4910-00-745-0654	W32593
	O,F,H	Organizational Maintenance, Common #2, Less Power (SC 4910-95-CL-A72)	4910-00-754-0650	W32730
2	F,H	Field Maintenance, Basic (SC 4910-95-CL-A31)	4910-00-754-0705	T24660
	F,H	Fuel & Electrical Systems, Engine (SC 4910-95-CL-A01)	4910-00-754-0714	T30414
	F,H	Tool Kit, Auto Fuel and Electrical Systems Repair (SC 5180-95-CL B08)	5180-00-754-0655	W32456
3	F	**DIRECT SUPPORT SPECIAL TOOLS CONSIST OF:**	5180-01-188-5100	
		Compression Device, Ring, Piston		130530
		Disc, Degree Gage (Magnetic)		100910
		Extractor, Injector		110030
		Gage, Depth, Dial Ind.		100400
		Jig, Gage Block		100640
		Pointer, Gage (TDC)		101300
		Removal Tool, Seal		120630
		Spring Tensioner		125300
		Tool, Locking		143400
4	H	**GENERAL SUPPORT SPECIAL TOOLS CONSIST OF:**	5180-01-188-5075	
		Gage, Torque		101910
		Gage, Wear (Piston Ring Grooves)		130360
		Mandrel, Expansion		123950
		Mandrel, Expansion		123960
		Stand, Cylinder Head		120900

Section IV. REMARKS

(1) Reference Code	(2) Remarks
A	Purge air from pump.
B	Repair by parts replacement.
C	Drain.
D	Inspect by testing.
E	Replace defective wire only.
F	Repair by repacking bearings.
G	Service by adjustment.
H	Repair holes and punctures with best locally available method.
J	Repair consists of welding only.

APPENDIX C
COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

No Components of End Item (COEI) or Basic Issue Items (BII) are available for the compressor unit.

APPENDIX D
ADDITIONAL AUTHORIZATION LIST

No Additional Authorization List (AAL) items are available for the compressor unit.

APPENDIX E
EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. SCOPE.

This appendix lists expendable/durable supplies and materials you will need to operate and maintain the compressor unit. These items are authorized to you by CTA 50-970, *Expendable/durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items)*.

E-2. EXPLANATION OF COLUMNS.

a. **Column (1), Item Number**. This number is assigned to the entry in the listing.

b. **Column (2), Level**. This column identifies the lowest level of maintenance that requires the listed item.

C – Operator/Crew
O – Organizational Maintenance

c. **Column (3), National Stock Number.** This is the National Stock Number assigned to the item. Use it to request or requisition the item.

d. **Column (4), Description.** Indicates the Federal Item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturers (FSCM) in parenthesis followed by the part number.

e. **Column (5), Unit of Measure (U/M)**. Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit the issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

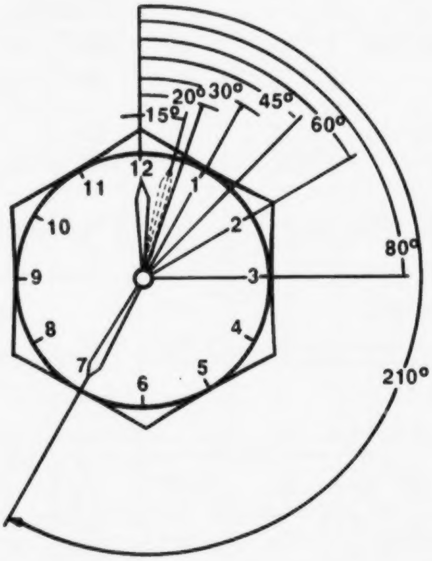
(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	O	8040-00-298-1946	Adhesive 8 oz cn	oz
2	O	9150-01-123-3152	Brake Fluid, Automotive 5 gl cn (81349) MIL-B-46176	gl
3	O	6850-00-264-9037	Dry Cleaning Solvent 55 gl dr (81348) P-D-680	gl
4	O	9140-00-419-0450	Fuel, Diesel 475 gl dr (81348) VV-F-800	gl
5	O	9150-00-190-0907	Grease, Automotive and Artillery 35 lb cn (81349) MIL-G-10924	lb
6	O	8030-00-779-4700	Liquid Gasket Material, Sealing Compound 5 oz tu (81205) BMS8-45	oz
7	O	9150-01-035-5395	Lubricating Oil, Gear 5 gl cn (81349) MIL-L-2105	gl
8	O	9150-00-402-2372	Lubricating Oil, Engine 5 gl cn (81349) MIL-L-46167	gl
9	O	9150-00-231-9062	Lubricating Oil, General Purpose 5 gl cn (81348) VV-L-800	gl
10	O	9150-00-250-0926	Petrolatum, Technical 175 lb cn (81246) 14P1	lb
11	C	7920-00-205-1711	Rag, Wiping 50-lb Bale (58836) A-A-531	lb
12	O	8030-00-004-4333	Sealing Compound 4 oz tu (19200) 10548829-2	oz
13	O	2920-00-077-1743	Wire, Lead (31295) 580539	ea

APPENDIX F
TORQUE LIMITS

F-1. ENGINE TORQUES.

a. To prevent faulty assembly, the following information includes instructions on the tightening of heavy-duty bolts. Because the procedure differs from that normally employed, the tightening angle is particularly important. The various angles can be readily obtained by comparison with a clock face.

b. To obtain the desired angle, the handle extension of the wrench must be turned by the same angle as that formed by the hour and minute hands of a clock. The 60° angles of a hex head bolt can also be a help.



(1) Wet threads and seatings with motor oil before fitting.

(2) Screw the bolts in until they are squarely seated, using a socket wrench without handle extension or a box or ordinary wrench without making use of the leverage.

(3) Preload the bolts by holding the handle extension so that both hands are in contact with the wrench. When using a box or ordinary wrench for preloading, the tip of your straight thumb holding the wrench must touch the head of the bolt.

(4) Tighten the bolts according to Table F-1, if necessary in stages, in conformity with the tightening angles specified.

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Table F-1. Engine Torques.

Designation		Pre-loading N•m	Tightening				Note
			1st Stage	2nd Stage	3rd Stage	Total	
Cylinder Head	210 1681	30	45°	45°	45°	135°	
Connecting Rod	M12x1.5x55	30	30°	60°	–	90°	
Bearing Cap	BM14x110	30	45°	60°	–	105°	
Idler Gear	M10x60	30	60°	–	–	60°	
Crankshaft Counter Weights	M12x60	30	30°	30°	–	60	
Flywheel	M10x1x35	30 30	30° 30°	60° 30°	– –	90° 60°	Waisted Bolt H 803 Bolt DIN 961
Flywheel	M10x1x40	30 30	30° 30°	60° 30°	– –	90° 60°	Waisted Bolt H 803 Bolt DIN 961
Flywheel	M10x1x45	30 30	30° 30°	60° 30°	– –	90° 60°	Waisted Bolt H 803 Bolt DIN 961
Flywheel	M10x1x50	30 30	30° 30°	60° 30°	– –	90° 60°	Waisted Bolt H 803 Bolt DIN 961
FL 912 Injector	M10 DIN 934-8 B 4 C	–	–	–	–	–	Tightening Torque 25 N•m
V-belt Pulley	M24x2x110	50	210°	–	–	210°	Left-hand Thread
Blower Assembly Fan	M12x140	30	30°	60°	–	90°	F ¾ L
Blower Assembly Fan	M12x180	30	30°	60°	–	90°	F ⅚ L
Filter Base Assembly	M10x160	30	30°	60°	60°	150°	
Alternator	M10x180 M10x230	30 30	180° 150°	– –	– –	180° 150°	
Idler Pulley	213 6384	30	45°	–	–	45°	
Engine Mounts	M14x100	30	15°	60°	–	75°	
Engine Mounts	M14x110	30	45°	60°	–	105°	
Engine Mounts	M14x125	30	45°	60°	–	105°	
Fuel Injection Pump	M12 M14x1.5	–	–	–	–	–	60 + 10 N•m 80 + 10 N•m

F-2. COMPRESSOR TORQUES.

All screws used in the air compressor are heat treated, high tensile screws. Table F-2 provides the torque values of all screws used in the reassembling of the air compressor.

Table F-2. Air Compressor Capscrew Torque Values.

Part No.	Size	lb.-ft.	N•m
35317106	M6 x 1.00 x 10 mm	7	9.48
35317148	M8 x 1.25 x 60 mm	18	24.40
35271154	M10 x 1.50 x 30 mm	32	43.30
35271188	M10 x 1.50 x 25 mm	32	43.30
35272533	M12 x 1.75 x 35 mm	58	78.50
35323112	Bearing Locknut	90	122.00

F-3. GENERAL TORQUES.

Use Table F-3 as a torque guide for all parts other than the ones covered in Tables F-1 and F-2.

Table F-3. General Tightening Torques for Bolts and Nuts.

Thread Diameter		Standard Torque	
in.	mm	lb.-ft.	N•m
¼	6.35	9 ± 3	12 ± 4
5/16	7.94	18 ± 5	24 ± 7
⅜	9.53	32 ± 5	43 ± 7
7/16	11.11	50 ± 10	68 ± 14
½	12.70	75 ±10	100 ± 14
9/16	14.29	110 ± 15	150 ± 20
⅝	15.88	150 ± 20	205 ± 27
¾	19.05	265 ± 35	360 ± 47
⅞	22.23	420 ± 60	570 ± 80
1	25.40	640 ± 80	870 ± 110
1⅛	28.58	800 ± 100	1085 ± 135
1¼	31.75	1000 ± 120	1355 ± 165
1⅜	34.93	1200 ± 150	1625 ± 205
1½	38.10	1500 ± 200	2035 ± 270

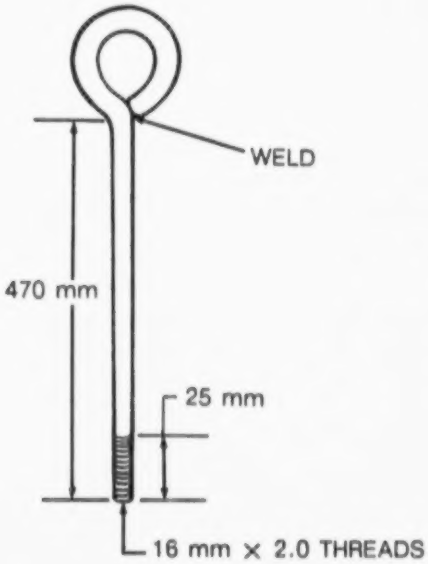
APPENDIX G
ILLUSTRATED LIST OF MANUFACTURED ITEMS

Section I. INTRODUCTION

G-1. SCOPE.

This appendix includes complete instructions for making items authorized to be manufactured or fabricated.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS



1. Two eyebolts are required.
2. Make from 16 mm stock.

Figure G-1. Engine Lifting Eyebolts.

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1-10	1-11		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Lubrication System; Under oil capacity it states that the initial fill is 2.9 gal. (11 liters) and 2.5 gal. (9.5 liters) for refill. During recent maintenance we were required to refill with 2.6 gal. of oil.

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter=10 Millimeters=0.01 Meters=0.3937 Inches
1 Meter=100 Centimeters=1000 Millimeters=39.37 Inches
1 Kilometer=1000 Meters=0.621 Miles

WEIGHTS

1 Gram=0.001 Kilograms=1000 Milligrams=0.035 Ounces
1 Kilogram=1000 Grams=2.2 Lb
1 Metric Ton=1000 Kilograms=1 Megagram=1.1 Short Tons

LIQUID MEASURE

1 Milliliter=0.001 Liters=0.0338 Fluid Ounces
1 Liter=1000 Milliliters=33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter=100 Sq Millimeters=0.155 Sq Inches
1 Sq Meter=10,000 Sq Centimeters=10.76 Sq Feet
1 Sq Kilometer=1,000,000 Sq Meters=0.0386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter=1000 Cu Millimeters=0.06 Cu Inches
1 Cu Meter=1,000,000 Cu Centimeters=35.31 Cu Feet

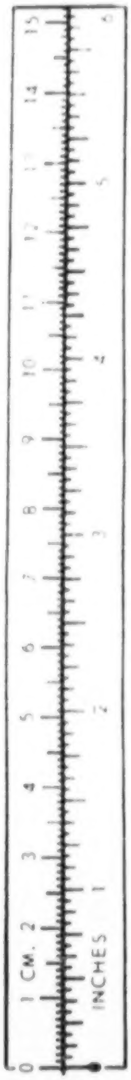
TEMPERATURE

5/9 (°F - 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C° +32=F°

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621



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